VOL. LXXXI . PART SIX

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

JUNE 1956

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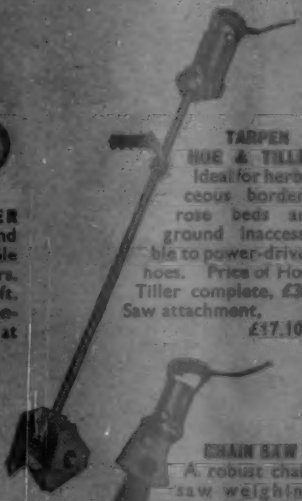

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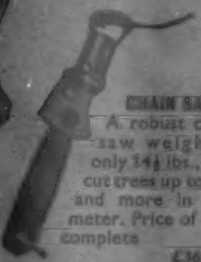

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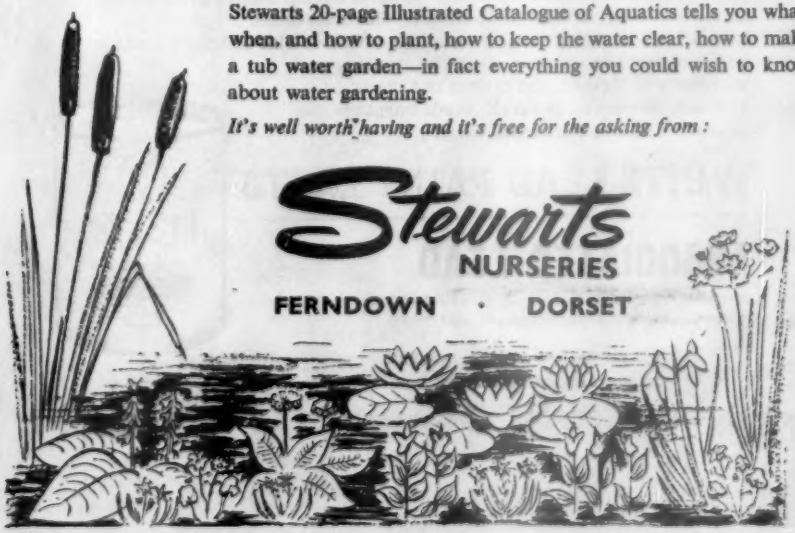

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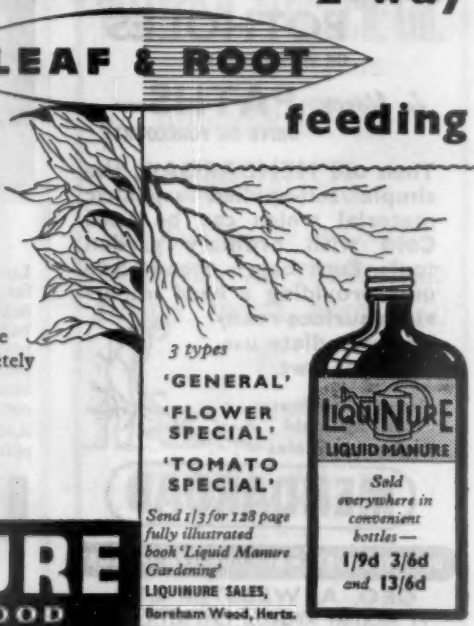

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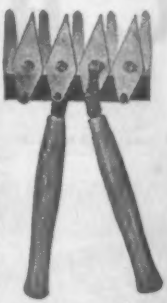

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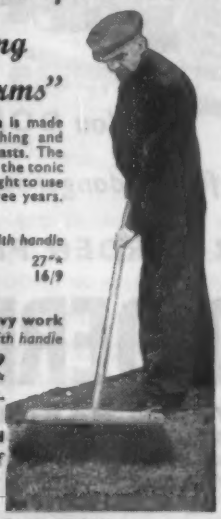

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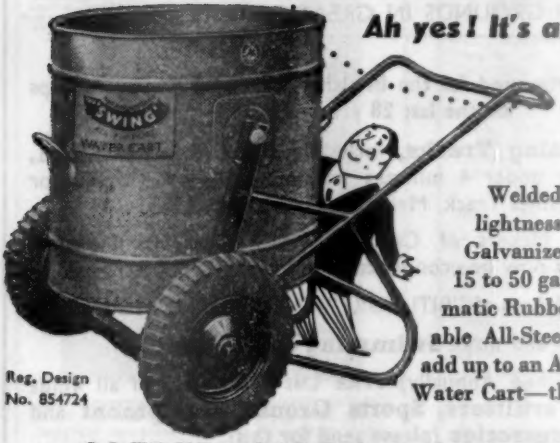

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3. Spray cabbages, especially under leaves, to keep butterflies away. (See the "Jeyes' Fluid in the Garden" leaflet: for details)

4. Another good deterrent is to mix some neat Jeyes' in a pail of finely sifted peat and sprinkle this—

5. lightly round the plants, renewing when the smell disappears or a day or two after rain.

6. You'll want Jeyes' for cleaning the greenhouse etc. later on, so get a quart or gallon can. It saves money!

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXXI PART SIX

June 1956

THE SECRETARY'S PAGE

ANNOUNCEMENTS—JUNE AND JULY

Shows

TUESDAY, June 5 12 NOON to 6 P.M.	Fortnightly Flower Show. Cactus and Succulent Society's Competition.
WEDNESDAY, June 6 10 A.M. to 5 P.M.	Geranium Society's Competition.
FRIDAY, June 8 12 NOON to 6 P.M. SATURDAY, June 9 10 A.M. to 5 P.M.	British Iris Society's Show. (See below.)
TUESDAY, June 19 12 NOON to 6 P.M.	Fortnightly Flower Show. Flowering Tree and Shrub Competition. Cactus and Succulent Competition for Amateurs (Sherman Hoyt Trophy).
WEDNESDAY, June 20 10 A.M. to 5 P.M.	British National Carnation Society's Pink Competition.
FRIDAY, June 29 11 A.M. to 7 P.M. SATURDAY, June 30 10 A.M. to 5 P.M.	National Rose Society's Show.
TUESDAY, July 3 12 NOON to 6 P.M.	Fortnightly Flower Show.
WEDNESDAY, July 4 10 A.M. to 5 P.M.	British Delphinium Society's Show.
TUESDAY, July 10 12 NOON to 6 P.M.	Floral Arrangement Competition. (See next page.)
TUESDAY, July 10 12 NOON to 7 P.M.	National Sweet Pea Society's Show.

Shows—*continued*

TUESDAY, July 17 12 NOON to 6 P.M. WEDNESDAY, July 18 10 A.M. to 5 P.M.	Fortnightly Flower Show. Fruit and Vegetable Competition.
TUESDAY, July 17 12 NOON to 7 P.M. WEDNESDAY, July 18 10 A.M. to 5 P.M.	British National Carnation Society's Show.
TUESDAY, July 31 12 NOON to 6 P.M. WEDNESDAY, August 1 10 A.M. to 5 P.M.	Fortnightly Flower Show.

Lectures

TUESDAY, June 5, at 3 P.M. "Leading American Hybridizers and their Introductions", by DR. P. G. CORLISS.

TUESDAY, June 19, at 3 P.M. "Spring Flowers in South Africa", by SIR FREDERICK STERN, O.B.E., M.C., F.L.S., V.M.H.

TUESDAY, July 3, at 3 P.M. "Apple Scars and Blemishes", by PROFESSOR H. W. MILES, D.SC.

TUESDAY, July 17, at 3 P.M. "Some Plant-hunting Experiences", by CAPTAIN COLLINGWOOD INGRAM, F.L.S., V.M.H.

TUESDAY, July 31, at 3 P.M. "Town Gardening", by MR. LANNING ROPER.

Demonstrations at Wisley—The following demonstrations will be given at Wisley, that on the second and subsequent day being in each case a repetition of that given on the first.

Fruit Garden

JUNE 27–28. Summer Pruning of Fruit Trees. (Commencing at 2 P.M.)

Flower Garden

JULY 18–19–20. The Vegetative Propagation of Shrubs and Herbaceous Plants. (Commencing at 2 P.M.)

The British Iris Society's Show—This Show will be held on June 8 and 9 (see above), not on June 1 and 2 as stated in the *R.H.S. Gardeners' Diary*.

Floral Arrangement Competition on July 10—This Competition is not mentioned in the Society's tickets as it was arranged after they were printed. All R.H.S. tickets will admit in accordance with usual arrangements. The charge for admission of the public will be:

12 NOON to 4 P.M.—3*s*.
4 P.M. to 6 P.M.—2*s*.

Lily Group Meeting—The Lily Group will hold its second meeting of the year in the Lecture Room in the New Hall at 4.30 P.M. on

Tuesday, June 19, when there will be an exhibition of 35 mm. lantern slides of lilies.

Exhibition of Containers for Horticultural Produce—The Ministry of Agriculture, Fisheries and Food, in association with the European Productivity Agency of the Organization for European Economic Co-operation, is organizing an Exhibition of containers (crates, boxes, cartons, etc.) used in the marketing of fruit, vegetables and flowers, in this and other countries.

The Exhibition is for the purpose of helping all those interested in the manufacture and use of cheap and efficient containers for horticultural produce.

The Exhibition will be held in the Society's Old Hall on June 6 (10 A.M. to 5 P.M.) and June 7 (10 A.M. to 5 P.M.), 1956, and Fellows and Associates are invited to attend. There will be no charge for admission.

INVITED TRIALS, 1957

The Royal Horticultural Society will carry out during the 1957 season the following trials, for which entries are invited.

Flowers

Freesia, from corms of named varieties suitable for cultivation under glass. (Twelve corms of each variety. Closing date for receipt of entry forms—July 31, 1956.)

Tulip, varieties of Darwin or hybrid Darwin tulips introduced since 1945. (Sixteen bulbs of each variety. Closing date for receipt of entry forms—August 31, 1956.)

Vegetable

Lettuce, Cos varieties suitable for overwintering under Dutch lights and subsequently for planting out in the spring. (½ ounce of seed of each variety. Closing date for receipt of entry forms—July 31, 1956.)

Conditions for entry to the trials

1. All entries must be made on the appropriate form obtainable from the Director, The Royal Horticultural Society's Gardens, Wisley, Ripley, Woking, Surrey.

2. Entrant must certify on the form either:

(*a*) that the variety or strain has been raised or developed by him;

or (*b*) that the variety or strain was, or is about to be, introduced by him to British commerce.

The entrant must also supply sufficient particulars of the history of the variety or strain to substantiate his certificate, but such particulars will not be published by the Society without the sender's consent.

3. Entry forms must be completed and returned to Wisley by the above specified dates.

4. Bulbs, corms and seeds should not be sent until the entrant receives notification that his entry has been accepted.

5. In the event of too many entries being submitted for a particular trial the Council of The Royal Horticultural Society reserves the right to scale down the number of entries received.

NOTES FROM WISLEY

J. B. Paton

IN these notes last month we considered some of the alterations made on Battleston Hill especially as they affected the rhododendrons. This month we will consider another aspect of the cultivations in this woodland garden which is the Peat Bank constructed on the northern slope. The work commenced in July 1954, was continued in September of the same year and finished in September 1955. Three reasons led to the choice of this site for a peat garden; first, it was noticed that primulas reproduced themselves naturally; secondly, that there is protection from the full sun with an overhead canopy of oaks and Spanish chestnuts; and, thirdly, that the site faces to the north. It is, perhaps, rather a steep slope and so requires a lot of small terraces. The front of these terraces is constructed from blocks of peat which have been cut from the nearby common, and behind these blocks of peat a compost of two parts loam, two parts peat and one part sand is used. If necessary iron rods can be driven into the peat blocks to hold them in position and for a similar reason moss is laid along the top. The terraces have been constructed so that the water runs off freely and does not accumulate to form a bog. Many of the plants used in this type of garden are as easily killed by too much water in winter, as they are by too little water in summer.

From these brief details given of the siting and the construction of the Peat Bank it will be realized that all the plants to be grown in such a site must be of necessity peat lovers, able to survive in the semi-shade and in moister conditions than are usually found in the normal soil.

One of the genera which should be at home in this garden is *Meconopsis* and especially to be noted this season will be the first flowering of many specimens raised from the seed collected on the 1954 Expedition to Nepal. Most of the plants are still being grown under the collectors' numbers as they have not been named definitely from the herbarium material. However, we do know that S.S.W. Nos. 7405, 7943, 8461 and 8668 are allied to *M. napaulensis*, S.S.W. Nos. 8480, 8481, 8482 and 8648 to *M. paniculata* and S.S.W. Nos. 8622 and 4627 to *M. regia*. Of these last two the first has a very fine winter rosette composed of bronze-haired leaves and the other had in the wild sulphur-yellow flowers.

Other species of *Meconopsis* include the blue *betonicifolia*, the deep blue *grandis*, its purple-spotted yellow hybrid with *integrifolia* grown under the name × *beamishii* and the white-flowered *superba*. All these

may grow to a height of 3½ feet, while of small stature are two yellow-petalled species under the names *dhwojii* and *villosa*.

All of these *Meconopsis* sp. should be at their best in early June and for earlier and later display we have a wide range of primulas. This commences in April when the Himalayan *Primula denticulata* raises its globose head of pale purple flowers some 12 inches from the ground. This plant has reproduced itself naturally along the roadside. Other early-flowering primulas are the Sikkimese *gracilipes*, the rose-coloured *glaucescens* from the Italian Alps and, from Tibet, *latisecta*. In May and early June there are the reddish-purple *secundiflora* and the lavender-blue *nutans*.

Other herbaceous plants to be seen include *Ourisia macrocarpa*, a New Zealand species with white flowers carried in whorls during late June and July, while in May and intermittently throughout the summer *Viola jooi* has mauve purple-streaked blooms. For later display there are the purplish-blue flowers of *Gentiana scabra* var. *saxatilis*. For early colour there are the rose, purple-veined *Oxalis acetosella* var. *rosea*, the blue *Soldanella villosa* and the green *Disporum oreganum* from N.W. America. The conditions on the Peat Bank also suit some of the ferns and in particular we may note *Adiantum pedatum* with tall arching fronds and *Blechnum pennamarina* with erect symmetrical fronds.

Shrubs are used on the Peat Bank to plant at the back to help to blend into the surrounding garden and also singly about the terraces to provide interest and relief from the herbaceous plants. Towards the rear of the Wisley Peat Bank are *Paeonia lutea* var. *ludlowii*, *Hydrangea sargentiana* and various rhododendrons. In the front are some interesting daphnes and of particular note are the early flowering scented *Daphne odora*, the pink hybrid 'Somerset', the Asian *acutiloba*, the dwarfer *oleoides* and the procumbent *cneorum* var. *eximia*. A single plant of the Chilean *Philesia magellanica* has survived the winter protected by a cage lined with bracken and so it should produce its rosy crimson flowers in June.

A supposedly difficult plant to flower is *Orphanidesia gaultherioides*. At Wisley there has for some years been a fine pan of it in the Alpine House; however, now we have a few plants of this member of the family Ericaceae to put in the Peat Bank. It was collected by E. K. BALLS and BALFOUR GOURLAY near the Black Sea where it appears to thrive on a diet of rotting pine needles. Other low-growing shrubs include *Cassiope tetragona*, with white bell-shaped flowers in May and early June, *Phyllodoce empetriformis* and *P. aleutica* and, from New Zealand, *Cyathodes empetrifolia*.

At the moment there are not many bulbous plants other than some interesting lilies. The conditions in a peat garden suit many of the American lilies and at Wisley we may note *L. columbianum* which has up to forty bright orange, Turk's-cap flowers on each stem, the rare American *bolanderi* which was acquired from the late W. BENTLEY'S garden at Quarry Wood and which has up to nine flowers, pale crimson within and wine red without, and also *nevadense* the panther lily of California. Of

the Asiatic lilies mention may be made of *wardii* with flowers of pure Martagon form which are pale pink spotted with dull carmine and of similar form are the white purple-speckled blooms of *duchartrei*. Of the hybrid lilies we may note a specially selected form of 'T. A. Havemeyer' which was presented to the Gardens by SIR FREDERICK STERN. The parentage is given as *L. henryi* × *L. sulphureum*.

PLANTS OF INTEREST AT WISLEY DURING JUNE

LABORATORY WALLS
- *Abelia schumannii*
- *Jasminum* × *stephanense*
- *Senecio laxifolius*

WILD GARDEN
- Lilies in variety
- Magnolias in variety
- *Meconopsis* species
- Primulas in variety
- Rhododendrons in variety
- *Stewartia* species
- *Styrax japonica*

SEVEN ACRES
- *Bruckenthalia spiculifolia*
- Deutzias in variety
- *Iris sibirica*
- Philadelphuses in variety
- Spiraeas in variety

AWARD OF GARDEN MERIT COLLECTION
- *Aethionema grandiflora*
- *Campanula portenschlagiana*
- *Cytisus albus*
- *Geranium ibericum*
- „ *sanguineum* var. *lancastriense*
- *Magnolia sieboldii*
- *Viburnum tomentosum* var. *mariesii*

WEATHER HILL
- *Buddleia alternifolia*
- *Cytisus battandieri*
- *Kolkwitzia amabilis*
- Paeonies
- Roses

VEGETABLE TRIAL GROUNDS
- Trial of Sweet Peas

ROCK-GARDEN AND ALPINE HOUSE
- *Aethionema pulchellum*
- *Allium moly*
- Campanulas in variety
- Cistuses in variety
- *Geranium dalmaticum*
- Helianthemums in variety
- *Hypericum* species
- *Nepeta nervosa*
- Phloxes in variety
- Pinks in variety
- *Rhodohypoxis baurei*
- *Rodgersia aesculifolia*
- *Roscoea humeana*
- Saxifrages in variety
- *Thymus serpyllum*

FLORAL TRIAL GROUNDS
- Trials of Delphiniums
- „ „ Perennial Lupins
- „ „ Pyrethrums
- „ „ Sweet Peas

HERBACEOUS BORDERS
- *Anchusa caespitosa*
- „ 'Morning Glory'
- *Campanula* 'Fleur de Neige'
- Delphiniums in variety
- *Geranium* 'Russell Prichard'
- *Lychnis chalcedonica*
- *Salvia haematodes*
- Veronicas in variety

BATTLESTON HILL
- *Abutilon vitifolium*
- Hostas in variety
- Lilies in variety
- Magnolias in variety
- *Meconopsis* species
- Primulas in variety
- Rhododendrons in variety

MEDICINAL PLANTS

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FOR the purposes of this address, I will define medicinal plants as whole plants, or parts of plants, which are, or have been, recommended for the treatment of human ailments, or for their reputed tonic effects. Special reference will be made to those mentioned in the British Pharmacopoeia and British Pharmaceutical Codex, which lay down standards for most of the plants in use in British pharmacy today.

We might well ask: How were the medicinal properties of such plants discovered in the first place?; Why should it be that the *leaf* of one particular plant should be used and the *root* of another? Let us go back, in imagination, nearly 20,000 years. It is not too difficult to picture Palaeolithic or Mesolithic man—even with his limited intelligence—noticing that animals would shun a particular plant which they knew by experience or instinct to be unpalatable or noxious, and would seek out others which were of benefit—just as the present-day domestic cat will chew grass to keep itself in condition. It may well be that the use of dried bog-moss—consisting largely of *Sphagnum* spp.—as an absorptive dressing for wounds, was known in the post-glacial period; linseed was cultivated in Egypt and elsewhere in the Stone Age.

The medicinal properties of Chinese rhubarb were known and described over 5,000 years ago; the knowledge of this and of other plants may have originated long before that, during times of famine, when the inhabitants of the country were reduced to eating roots, barks, and so on, in an attempt to stave off their hunger. The early civilizations of the Orient owed a great deal of their knowledge of drugs and spices to SHÊN NUNG, the father of Chinese medicine, who used himself as a guinea-pig to test the actions of herbal preparations.

Later, MITHRIDATES, king of Pontus (a war-like Asiatic stronghold), similarly experimented on himself; however, he also tried them out on his prisoners-of-war—presumably if he had any doubts in the matter.

The hemlock (*Conium maculatum*) was used as an Athenian State poison, and its administration to SOCRATES is known to every schoolboy. Another umbellifer, *Cicuta virosa*, is believed to have been used for the same purpose.

The poisonous properties of *Strychnos* and *Chondodendron* species have long been known to South American tribes, who made preparations (known as curare) for use as arrow-poisons, while in Africa *Strophanthus* species were used for a similar purpose. Also in Africa, the toxic seeds of *Physostigma venenosum*, known as "ordeal beans",

were used in the trial of suspected criminals; the latter, who were forced to partake of these seeds, were adjudged innocent if they survived and guilty if they did not.

Knowledge of herbs would also be acquired by unfortunate accident —for example, by the eating of poisonous berries in mistake for edible fruits, as those of the woody nightshade or bittersweet (*Solanum dulcamara*). The roots of the water-dropwort (*Oenanthe crocata*), are thickened into tubers resembling parsnips, and are said to taste not unpleasantly; several deaths have been reported from this cause. Poisoning has been caused in children by the seeds of laburnum or golden rain (*Laburnum anagyroides*). Dermatitis has resulted merely from contact with the poison ivy (*Rhus toxicodendron*), and with certain species of the genus *Heracleum*.

By whatever means the knowledge was acquired, it is certain that the medicinal use of many plants is of very great antiquity. Four thousand years ago, cultivation of medicinal plants was being encouraged in Babylonia, and the temples of Egypt were the herbal laboratories of those times. Even in England, evidence has been found that coriander (*Coriandrum sativum*), purging flax (*Linum catharticum*), and the stinging nettle (*Urtica dioica*) were in existence during the Bronze Age, though it is not known if they were being used medicinally at the time.

The period about the birth of Christ saw the stimulation of theoretical materia medica by the Greeks and Romans, in particular by DIOSCORIDES, PLINY, HIPPOCRATES, and THEOPHRASTUS, and drugs such as gentian and cinnamon were described. The Roman invasion of Britain introduced new plants, but, for a period of several hundred years after the Romans left Britain, there are no adequate records.

In Arabia, AVICENNA and IBN BAITAR contributed to materia medica by introducing drugs of Indian and Arabic origin; in the ninth century, a Chinese medicinal beverage was introduced into Britain, and became so popular that it is now being used at the rate of 200,000 tons per annum. It is, of course, *tea*! The Anglo-Saxons used many more herbs than did the contemporaneous peoples of the Continent, and published their first herbal about a thousand years ago.

In the early Middle Ages, most of the herb-growing was carried out in the monasteries, where the monks, in their self-contained community, tended the sick who came from far and wide, and carried out the peaceful and congenial pastime of blending and mixing the herbs into medicines. And though we might accuse them of "blunderbuss" prescribing or "polypharmacy", for they would include perhaps as many as a hundred herbs in the hope that, whatever the illness, *one* of them would effect a cure; two such products, of the Carthusian and Benedictine monks respectively, are now known to us under the illustrious titles of "Chartreuse" and "Benedictine".

Among the earliest recorded monastic herb gardens in Britain are those of Christchurch, Canterbury, and St. Albans, and the College

Garden of Westminster Abbey. In addition to the herbs grown in the monastic gardens themselves, we find, from the accounts of the prior, cellarer, and infirmarer, of the Middle Ages, that wide use was made of drugs and spices imported from foreign countries, often at considerable expense. With the Dissolution of the Monasteries, herb-growing became the prerogative of the gentry, who had the time, knowledge, money, and inclination to pursue this hobby, and many of the old castles and manor houses still bear witness to the plants which were grown there.

The twelfth and thirteenth centuries saw the establishment, mainly in Italy, of the first medical schools and universities, which laid out their own gardens for medicinal plants, and thus there came an important change from theory to practice in the teaching of materia medica. Despite this, superstition and inaccuracy hindered progress for many hundreds of years. The so-called "Doctrine of Signatures" was propounded in the belief that a plant revealed by its shape, colour, or other feature, which illness it would cure, or the part of the body to which it should be applied. Thus a plant with red flowers was intended for conditions of the blood, and yellow flowers for jaundice; the drooping appearance of comfrey flowers indicated that the herb would drive away melancholy, and the tuberous roots of some orchids were suitable for masculine debility. The names Lungwort and *Pulmonaria* were given to the plant with mottled leaves which were supposed to bear a resemblance to the lungs.

Astrology, too, had a considerable vogue, the virtues of the drugs being ascribed to the influence of the planets. As an example, the foxglove, according to NICHOLAS CULPEPER (1616–54)—was under the dominion of Venus, and was suitable for almost everything from the "king's evil" to "scabby head"; unfortunately, he omits to mention its action on the heart, though it is used almost entirely nowadays for its effect on cardiac muscle. There is reason to believe that CULPEPER was a complete fraud, and was quite deliberate about it; it also appears that he made a very satisfactory living out of the populace of London's East End.

Superstition was associated with many medicinal plants, and the art of healing with many an absurd ritual. That people ever got better was a tribute to psychology and natural processes. An example was the English mandrake (*Mandragora officinarum*), whose subterranean portions often bear a striking resemblance to a human being. To make things worse, it was said to squeak when pulled from the ground. The inhabitants were duly awed by this, and refused to dig it up, in case dire consequences befell as a result. They therefore resorted to the following crafty expedient: a dog would be starved for some time, and tied to the plant in question. A succulent piece of meat would then be held just out of reach of the animal, which would be induced to make the most frantic efforts and thereby pull up this accursed plant.

The first major botanic gardens in Britain were established in the

seventeenth century at Oxford, Edinburgh, and Chelsea, and this advance opened up a new era in the study of botany and materia medica. The microscope had but recently been discovered, and later improvements were to result in the compound instrument. The word "pharmacognosy" seems to have been coined in 1815, and has—so far as pharmacists are concerned, at least—replaced the term "materia medica" in current practice. This difference was later amplified by PROFESSOR ROBERT BENTLEY (who, in association with HENRY TRIMEN, published the four beautiful volumes on "Medicinal Plants", which still remain as a source of accurate botanical information), and by workers, both here and abroad, of the eminence of JONATHAN PEREIRA, DANIEL HANBURY, F. A. FLÜCKIGER, and PROFESSOR GREENISH. The term "pharmacognosy" is rather more specific, in the sense that greater stress is laid on detailed microscopy and quantitative evaluation, and less on physiological action. On the other hand, the sphere of the modern pharmacognosist is by no means limited to medicinal plants: by virtue of his specialized training, he is well equipped to deal with analysis of food and drugs, plant and animal fibres such as may be used in surgical dressings, filtering materials, and the like—and, in fact, is often called upon to do so.

Now to a consideration of medicinal plants, as used in present-day practice. The British Pharmacopoeia (B.P.), published by the General Medical Council, is the official publication in this country, and it names plants which produce the following drugs:

Belladonna, caraway, cardamom, cascara, cinnamon, clove, colchicum corm, coriander, digitalis leaf, fennel, gentian, ginger, hamamelis leaf, hyoscyamus, ipecacuanha, lemon peel, liquorice, male fern, nutmeg, nux vomica, orange peel, quassia, quillaia, rhubarb, senna fruit, senna leaf, and stramonium.

In addition, monographs are given on over twenty oils of plant origin, and on the following plant products:

Acacia, aloes, benzoin, colophony, opium, podophyllum resin, starch, storax, tar, tolu balsam, and tragacanth.

The British Pharmaceutical Codex (B.P.C.), which is the authoritative publication of The Pharmaceutical Society of Great Britain, includes in addition a number of other plants which still have a wide application in medicine in the country.

A comparison of foreign pharmacopoeias with our own produces startling results. The International Pharmacopoeia, and those of the United States and the Scandinavian countries use very few medicinal plants, whereas Germany, the Netherlands, and the South American countries include a remarkable range. This is partly due to the very natural preference for such plants as are indigenous, and this is why we find, in the pharmacopoeias of Brazil and Chile, plants with such exotic, romantic, and mellifluous names as *Cayaponia tayuya*, and the passion-flower, *Passiflora incarnata*. Colonial influence is to be seen in the

pharmacopoeias of the Netherlands and, to a lesser extent, France; the British Pharmaceutical Codex, which, at one time, was full of plants of Indian origin, deleted them wholesale from its later editions—after the British retired from that country.

Obviously every country wishes to become as self-sufficient as possible in its medical requirements; this is seen in the extreme case in the Soviet Union, which is geographically one of the few capable of attaining this independence.

Thus we find that the drug aconite, which, in the B.P.C. is obtained from *Aconitum napellus*, is, in the U.S.S.R., derived from the varieties *tianshanicum* or *turkestanicum*, and in India from *A. chasmanthum*; the drug gentian, which the B.P. states is from *Gentiana lutea*, is, in Japan, derived from *G. scabra* var. *buergeri*. Similarly, many Far-Eastern countries have a preference for the indigenous cassia bark, rather than cinnamon bark imported from Ceylon. Peppermint oil of the B.P. is derived from *Mentha piperita*, whereas Japanese and Chinese peppermint oils are obtained from *M. arvensis* var. *piperascens* and var. *glabrata*. (In passing, we might note that the B.P. lays down standards for peppermint oil, whereas the herb itself is not official.)

Despite the variation just mentioned, it is interesting to note the universal recognition of such medicinal plants as the foxglove, *Digitalis purpurea*, and the thornapple, *Datura stramonium*. These are used in nearly every country in the world. On the other hand, wild cherry bark, from *Prunus virginiana*, long studied by British pharmacy students, and incorporated into cough linctuses, is utterly disregarded outside the B.P.C.

The 1954 edition of the B.P.C. deleted the three drugs bearberry leaf, condurango, and manna, although these are recognized by two-thirds of the pharmacopoeias of the world. Half of the pharmacopoeias use the bog-bean or buckbean (*Menyanthes trifoliata*), pheasant's-eye (*Adonis vernalis*), balm (*Melissa officinalis*), and mullein, from *Verbascum* spp.; many use the drug salep, which is obtained from the tubers of certain plants of the Family Orchidaceae. None of these are recognized in British pharmacy.

For various reasons, certain drugs fall out of favour. The fragrant rhizomes of *Iris florentina* and other species of *Iris*, in powder form, became popular as a basis for dentifrices and face-powders (Fig. 73). Unfortunately, some individuals developed allergic conditions with its use, and so, out goes orris root. Certain species of *Ferula* yield the drug asafoetida, which has a vile smell resembling garlic, and one can well appreciate a certain reluctance to keep either of these drugs in pharmacy!

Angelica has departed from the B.P.C.; however, its stalks will still continue to decorate cakes, its roots to flavour gin, and its seeds vermouth, chartreuse, and some muscatel wines.

And here are two examples of plants which are used only in herbal practice, and receive no official recognition anywhere: first, the

lavender cotton, *Santolina chamaecyparissus*, which was used externally to heal bites and internally as an emmenagogue, and, secondly, the elecampane, *Inula helenium*, which was supposedly the plant grasped by Helen of Troy when she was carried off by Paris. The root is used, in combination with other herbs, for bronchitis, coughs, and colds.

Some of the items which are mentioned from time to time in the foreign pharmacopoeias strike a familiar domestic note: we find monographs on walnut leaf, buds of poplar and pine, and the horse-chestnut seed. The Germans and the Dutch prepare an official type of coffee, under the name "Quercus Tostum", from roasted acorns. We note with some affection the names of the red currant and the bilberry; the apple, grape, potato, and horse-radish; the strawberry (its fruit, leaf, or rhizome); primrose and cowslip; meadow-sweet, sundew, marigold, shepherd's purse, and white deadnettle; and even the leaf of the nettle and the poison ivy!

Now let us consider the chemical constituents of our medicinal plants, and the ways in which they are extracted to make suitable pharmaceutical preparations. After all, much of the bulk of a plant consists of water, cellulose, and other inert materials, and if we can in some way extract the active ingredients and reduce them to a small bulk, it will simplify manipulation in the dispensary.

1. Carbohydrates, e.g. sugars and starches.

(*a*) Manna, from *Fraxinus ornus*, the manna ash. An incision is made with a knife through the bark; a sugary deposit is formed, and can be picked off.

(*b*) Starches, such as potato starch, are usually prepared by pulping the raw material, passing it through a sieve, and washing it in a sloping trough, when the starch falls to the bottom.

2. An important group called glycosides, which are usually subdivided as follows:

(*a*) Those acting on the heart, as those of digitalis, strophanthus, and squill.

(*b*) Those which have a chemical structure related to anthraquinone, as those of cascara, rhubarb, etc.

(*c*) The saponin group, which froth on shaking with water. These occur in quillaia, sarsaparilla, etc.

(*d*) Colouring glycosides, as in red rose petal.

(*e*) Those associated with small quantities of prussic acid, as in the wild cherry bark and cherry-laurel leaf.

(*f*) The mustard group, as in mustard seed and horse-radish.

Now these glycosides, as shown above, might occur almost anywhere in the plant—in the leaf of the foxglove, the bark of quillaia, the root of sarsaparilla, or the red rose petals. Usually they are unstable, and are associated with enzymes which, on the death of the plant, and in the

presence of moisture, induce a chemical change in the active ingredient. It is worth noting that nearly every biological and many non-biological destructive processes take place in the presence of water. Therefore, as a general rule, it is important to dry the fresh plant as quickly as possible, compatible with a reasonable temperature which will not decompose the active principles. Having done so, it is possible to extract these active ingredients with (say) diluted alcohol, and make a product which remains stable for a reasonable period.

3. Gums. Acacia gum (gum arabic) is produced in an interesting way. The particular tree is dealt a smart blow through the bark with an axe, and after about three weeks the gum forms in rounded or pear-shaped "tears" at the site of the incision. The gum is therefore "pathological" in origin—being produced by injury.

On the other hand, gum tragacanth, which is an ingredient of many hair-setting lotions, is pre-formed in the plant. The walls of some of the internal cells are gradually transformed into a viscous gum which, when an incision is made in the stem, immediately pushes itself outwards like a worm, and dries on contact with air.

4. Tannins are complex substances, usually used medicinally for their astringent effect. They are present in such drugs as hamamelis leaf, krameria, and catechu.

5. Alkaloids. This is a large and important group of substances, usually defined as nitrogen-containing compounds which have a pronounced and often toxic physiological action, for example morphine, strychnine, nicotine, caffeine, and quinine. They are found in many parts of plants and are usually readily extracted by alcohol.

6. Oils, fats, and waxes. The so-called "fixed" oils commonly occur as food materials in the endosperm of seeds, for example, castor oil and linseed oil, but olive oil and palm oil are obtained from the fleshy pericarp of the fruit. The normal method of extraction is by brute force, that is by subjecting the material to a pressure which may be as much as three tons per square inch. Certain waxes, such as carnauba wax, are simply collected by scraping from the leaves of the plant (*Copernicia cerifera*).

7. Volatile or essential oils are very different in chemical and physical properties from the fixed oils. They are not usually so viscous, they are volatile in steam, and they have characteristic odours—often very pleasant—such as the flower perfumes, oil of lemon, etc.

In the Family Labiatae, these oils are found in characteristic glandular hairs, for example, on the petals and sepals of lavender.

Sometimes the oil is found in special secretory cells within the plant; it can readily be expressed by indenting the surface of orange peel or clove with the finger-nail. In ginger, the oil is associated with resinous material in cells scattered throughout the rhizome. In the fruits of the Family Umbelliferae, oil is contained in canals known as "vittae", which run vertically between the ridges of the fruit.

Essential oils are readily extracted by steam distillation, but this

method has an adverse effect on most citrus oils. Delicate or expensive flower perfumes may be extracted by "enfleurage", in which successive batches of flowers are left in contact with refined lard or suet for 24 hours; the "pomade" is then extracted with alcohol.

8. Resins, balsams, and similar substances. These are complex substances, usually semi-solid, which may occur naturally in ducts or glands present within the plant, as in pine, or may be produced only after deliberately maltreating the plant. For example, to obtain balsam of Peru, the trunk of *Myroxylon pereirae* is well beaten with a blunt instrument. A week later, the natives return and char the trunk with flaming torches. The balsam which then flows is soaked up in cloths and squeezed out in a press.

9. Other plant constituents include the colouring matters, e.g. chlorophyll, and vitamins.

On the subject of constituents, it is interesting to observe that species related by the arbitrary taxonomy of mortal men often show similarity in therapeutic properties, due to the active principles provided by nature, for example, the acrid and poisonous properties of the Ranunculaceae: aconite, hellebore, cimicifuga, and hydrastis; and the innocuous aromatic oils of the Labiatae: peppermint, sage, and thyme.

Much of the research into medicinal plants is ultimately concerned with methods of obtaining a maximum of active principle with a minimum of difficulty. The content of active principle is obviously the difference between the amount formed and the amount eliminated, and these in turn are dependent on several factors: (*a*) hereditary factors present in the seed; (*b*) climate; (*c*) soil conditions; (*d*) manurial treatment; (*e*) changes during drying processes, etc.; (*f*) conservation and storage. We shall consider these in turn.

To a certain extent we can interfere with the genetics of the seed by exposing it to shortwave radiation, or by the induction of polyploidy by such means as colchicine treatment. Let me amplify the term polyploidy. Each cell nucleus contains a number of bodies called chromosomes which carry the hereditary factors controlling such basic features of the plant as height, appearance, and so on. Limited treatment with colchicine of a cell which is in the process of dividing has the effect of doubling the original number of chromosomes. The condition of an excess of chromosomes is termed polyploidy.

Now work on belladonna and stramonium plants having this double complement has produced several interesting facts:

(i) They contain 50 to 150 per cent. more alkaloid.
(ii) The roots are richer in alkaloid, and are primarily responsible for the all-round increase in alkaloid content.
(iii) The tops had a greater *capacity* for storage of alkaloid.
(iv) The tops exert an influence on the progress of root synthesis.

Indications are that the maximum amounts of active principles in any plant are produced when the climatic conditions allow optimum development of the plant. Growth is usually retarded by ultraviolet light, as we see with alpines, and ultraviolet light decreased the content of active ingredients of digitalis, spearmint, and thyme, though increasing the alkaloidal content of stramonium. Belladonna shoots and *Ricinus* seedlings grown in the dark were shown to have an increased percentage of alkaloid, while the reverse was true of *Lupinus* seedlings. Belladonna shoots devoid of chlorophyll increased their alkaloidal content considerably on exposure to light.

It has been shown that leaves are able to excrete alkaloids and mineral salts through the epidermis, and that these can be washed off by rain or dew. Therefore it would be inadvisable to harvest such plants in wet weather. Alkaloid-containing plants were found to be more numerous in rain forests than in arid situations, though with essential-oil plants it is the reverse. The presence of essential oils in a plant has the effect of lowering the transpiration rate. There is a tendency towards loss of volatile oils in windy weather, especially when these are produced superficially, as in the Labiatae.

Soil research has shown that nitrogen manuring is beneficial to the alkaloid content of plants, particularly if the relative proportions of the other elements calcium, phosphorus, and potassium are maintained. Excess of sulphate of ammonia may cause damage.

On the matter of conservation of plant activity during drying, attention has been paid to the following points:

(i) Prevention of enzyme action. As mentioned earlier, it is important to strike a balance between a high temperature which may destroy the active principles and a lower temperature at which the enzymes are most active.

(ii) The drying of plants containing volatile oils. A temperature of 30 to 35° C. is suggested as the maximum for the Labiatae, and 40 to 45° if the oils are in the interior tissues, as in the roots of some Compositae and Umbelliferae.

(iii) The effects of sunlight, and especially ultra-violet light. Usually the requirements are that plants should be "dried in the shade". Drying by infra-red rays, which have little biological or chemical effect, can cut the drying time by at least half. Leaves of the Labiatae, when dried in the sun, can lose 25 per cent. of their volatile oil. Solanaceous drugs have been shown to be rather richer in alkaloid when sun-dried than when dried in the shade; the colour of the drug was little affected, though bleaching could occur if exposure was continued after the drug was dry.

Much interesting work has been done on the origins of alkaloids in plants. Grafting experiments in which a *Datura stramonium* scion was grafted on to a tomato or potato stock produced a plant possessing all

the usual characters of stramonium, except that it contained no more than traces of alkaloid, while a tomato grafted on to stramonium produced a typical tomato plant, but this contained alkaloids, except in the fruit itself. (This fact was turned to good account in America, where growers found that nematodes attacked the roots of tomato but not of stramonium.)

At the outset, the endosperm and embryo of stramonium contain no alkaloid, and it has been found possible to produce an alkaloid-free germination by growing seed freed from the outer tissues.

Digitalis is a most important drug, but the isolation of its constituents has been a matter of great difficulty for more than a century. This, and methods of standardization, are engaging the attention of many research workers, both here and abroad.

Following on the work of GREENISH and others, about the end of the nineteenth century, research was further stimulated when the University of London recognized pharmacognosy as an independent subject, and appointed a University Reader. Statistical measurements were made of different tissues of plants, such as hairs, fibres, vessels, calcium oxalate crystals, as a means of recognition, and to determine the presence of adulterants in the powdered drugs. Limitations were imposed on the quantities of less active parts of plants which could be allowed in an official drug, for example stalks in the presence of fruits. Drugs were incinerated and the ash weighed; this figure would serve as a standard to detect adulteration by soil or similar substances. Drugs such as ginger were extracted, the solvent evaporated, and the residue weighed; this figure would serve as a standard to detect a drug which had previously been exhausted for fraudulent purposes.

The uniformity in size of lycopodium spores, and the calculation that 1 milligram contains 94,000 spores, was of far-reaching importance in the analysis of powdered drugs, and the method has been applied commercially in many other ways—even to determining the fineness of toothpaste and chocolate particles.

It has been found possible to differentiate between species of the same genus by noting the ratios of epidermal cells, palisade cells, and stomata in leaves, or the numbers of veinlet terminations in unit area.

The use of ultra-violet light is of value in confirming powdered drugs and detecting adulteration.

Other work has been done, and is being done, on the active constituents of raspberry leaves, and on species of *Aspidosperma* and *Aristolochia*, and it is reported that a substance with anti-tubercular activity has been found in *Adhatoda vasica*. Seaweeds were investigated, and a constituent, alginic acid, has been used in pharmaceutical emulsions and lotions, as a soluble dressing in surgery, as a strengthener of wool yarn, a thickener for soups, as sausage skins, and even synthetic glacé cherries. The complex nature of curare is being elucidated, and one ingredient is said to be so potent that 1 gramme would kill 300 tons of mice!

The use of spices and oils as preservatives has been examined, and, of course, chlorophyll was subjected to intense investigation. PROFESSOR EDMAN of Sweden was awarded the Hanbury Medal for original research into the silica and carbonate structures which are left when plant material is carefully incinerated.

At Manchester, apart from the work on digitalis, research has been carried out on insect infestation in powdered drugs, and quantitative estimations are becoming available. My own work has produced two new techniques which will be of value in pharmacognosy and other fields.

Now, what of the future, as regards medicinal plants ? The trend of the pharmacopoeias is to reduce the number of official plants for several reasons:

(i) It is better to have active principles prepared synthetically wherever possible, as their specific action can be more closely controlled.
(ii) It is easier to avoid adulteration—sometimes it is difficult to ensure the accuracy of native plant collections.
(iii) Possible degradation of plants, both growing and in storage; difficulties of avoiding insect infestation.
(iv) To avoid importation expense, and avoid possibility of monopoly by other countries.

On the other hand, synthetic chemistry is not always the answer. The action of morphine, for example, is not that of opium, which contains many other modifying factors. The same applies to rhubarb, cascara, and many others. Further, it is often uneconomical to synthesize the active principles when the natural drug is relatively inexpensive and the ingredients readily extracted, for example quassia.

There will be a tendency towards growing "typed" plants under controlled conditions, in order to provide a basic universal standard, and avoid variation in constituents. This is particularly true for digitalis and the solanaceous drugs, which are used all over the world.

It must also be remembered that there is still a vast herb practice in this country, despite reduction in domestic cottage-garden cultivation. Many people prefer to purchase the herbs of the field rather than obtain "doctor's medicine" through the National Health Service at next-to-nothing.

Further, it occasionally happens that the native folk-lore provides a clue to discoveries of major importance in the field of medicine. For example, species of *Rauwolfia*, which has long been used in India and other eastern countries for a generous though indeterminate range of complaints, had a limited local use in Bihar as a children's sedative. The drug leaped into prominence when it was confirmed that certain of its constituents were useful in the treatment of nervous tension and high blood-pressure, and so much research was done that the natural sources of the plants have been largely denuded. Other similar examples are *Ammi visnaga*, and *Rhamnus frangula*. It may well be that modern

techniques such as chromatography and electrophoresis on the lesser-used or lesser-known plants will produce equally important results.

Certainly, pharmacy can do with all the pharmacognosists she can get. We have only just scratched the surface of a field with fascinating and far-reaching possibilities. The realm of medicinal plants is still wide open for those who care to look a little closer.

THE CULTURE AND HYBRIDIZATION OF ORCHIDS

David Sander

(*Lecture given on March* 22, 1955; MR. C. H. CURTIS, M.B.E., F.L.S., V.M.H., *in the Chair*)

THE CHAIRMAN: It gives me very great pleasure to take the Chair at this meeting and to introduce the lecturer, MR. DAVID SANDER, who is to talk to us about hybrid orchids. The firm of which he is a member has long been associated with orchids—the importation of orchids in the older days and the raising of hybrids in later days. MR. DAVID SANDER is the third generation of the firm whom I have had the pleasure of knowing, for I knew both his father and his grandfather.

MR. SANDER is going to talk to us about hybridization and I think he is also going to make some comparisons between hybrids and species.

MR. DAVID SANDER: The subject on which I shall speak is a very wide one, but I have chosen to limit myself to a rather critical look at the hybrids *vis-à-vis* the species. I have, quite deliberately, chosen a very controversial subject, namely, the limited advances in hybrids and the all too prevalent ignorance of species. I do this because I feel that the species themselves, in so many cases, show how little advance has been made in hybridization. The present orchid-growing public is very clearly divided into those who grow species and those who cultivate hybrids, with a most definite bias in favour of the latter. They do not remember the days when we imported orchids and produced some very fine varieties, proof of which you can read about in the many books on orchids or see if you glance through the paintings of plants which have received awards in the R.H.S. collection. That is one existing disadvantage from which the modern orchid-growing public suffers, and one reason why they do not appreciate the species. Unfortunately, too, few of them have seen the fine old species in flower.

I would suggest, for example, that cattleyas in the *Labiata* section have scarcely been improved at all, being, in so very many cases, mere back-crosses on to well-known species. These well-known species, in their finest forms, are almost or quite as good as their progeny of the third and fourth generation. Even since the war, my firm has introduced, in a very limited batch of *Cattleya mossiae*, one which has proved to be a very fine variety.

Some seventy-five years ago, The Royal Horticultural Society—a very enterprising organization, which is deserving of our thanks for a great many things—held an Orchid Conference at its gardens, then in South Kensington. I would strongly recommend anyone who seriously thinks of hybridizing orchids to read the masterly lecture given on that occasion by MR. HARRY VEITCH, later SIR HARRY VEITCH, on the hybridization of orchids. SIR HARRY'S firm raised the first orchid hybrid, and he held the field in hybridization for a decade or two. He was, however, sufficiently self-critical to make the following observations at the Conference during his lecture:

"But reviewing the sum total of results already obtained, can we, considering the ceaseless watching and assiduous care seedling orchids require before reaching the flowering stage, look upon them with unmixed satisfaction? How few of the best of them bear favourable comparison with the numberless lovely flowers borne by plants that owe their origin to the unerring instinct of the little winged tribe that unknowingly, and perhaps unconsciously, have performed their allotted tasks for ages past, and proving, by the perfection of their work, how inapt an operator is man."

After quoting that very profound statement, which is just as accurate now, seventy-five years later, I should like to quote some remarks made by somebody else on the subject of hybridization, but this time referring to roses. In a brilliant lecture last year, ANN P. WYLIE, of Manchester University, spoke of the rose species as yet untouched by hybridists. In spite of the wealth of glorious roses available today—as we see in gardens all over the country and in the shows in this hall—only about 5 per cent. of the species have been used. She said:

"It is unlikely that anything further really novel will be produced simply by crossing and re-crossing the varieties in present-day groups. Breeders will have to turn more and more to little used, or unused, species in their quest for new characters."

As she says, it is a fact that only 5 per cent. of rose species have been used to produce modern rose hybrids. No doubt there is good reason for this, e.g., the time lag and lack of capital; and that same reason applies with even greater force to orchids, which are slower growing.

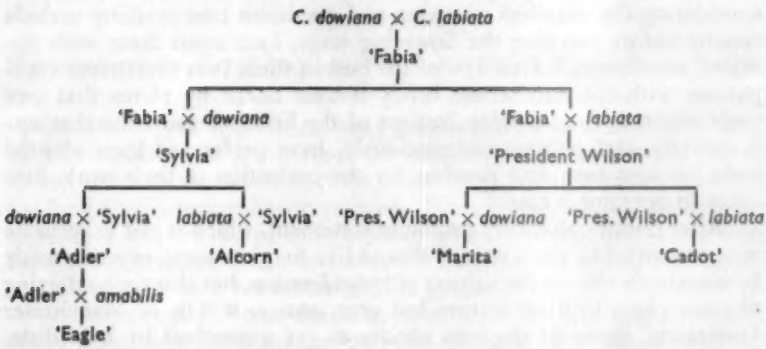
How true this statement is of orchids is also illustrated by the fact that, of some 23,000 hybrids registered in *Sander's List of Orchid Hybrids* (which goes back to the first cross made in 1853), only 473 species have been used, and those in only 32 genera. The great majority of these species have been used only once, and now their hybrids are no longer to be found in cultivation. There are actually well over 16,000 true species known, and these include many hundreds of real promise to hybridists.

In the last three years, as well I know, having recently spent many hours on the publication of the latest *Hybrid List Addendum III*, only fourteen new species have been used in the make-up of the 2,365 new hybrids listed for the three-year period ending December, 1954.

That is an extraordinary situation in these modern days, when we have ways and means of getting things done and when, in the case of some countries, the Governments subsidize orchid culture. It is a deplorable thing that so few species should be used, and I feel very strongly on this matter. If one looks into the history of many orchids, one finds that in nine cases out of ten the grower is in such a hurry and so keen to make money that he back-crosses to a very great extent.

I should like to illustrate this for you by referring to the chart on the blackboard.

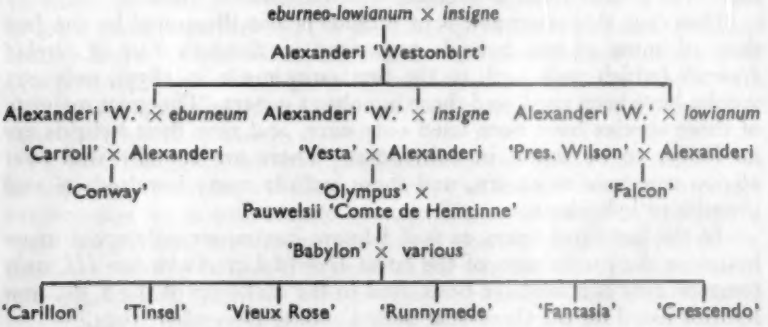
PEDIGREE OF *CATTLEYA* 'EAGLE'



The above pedigree covering four generations illustrates how eventually it was necessary to bring in the fresh blood of the species *C. amabilis* to produce 'Eagle', further back-crosses having proved sterile.

The principle is noticeable in the breeding of Cymbidiums as is shown in the pedigree of 'Babylon', which alone got through what I like to call "the chromosomal barrier" in the fifth generation and produced results in the sixth generation, but *only* through the introduction of *insigne*, contained in the parentage 'Olympus'.

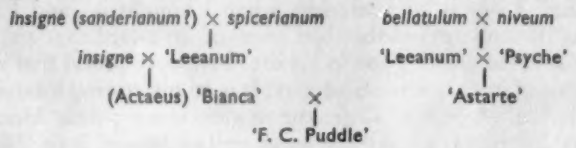
PEDIGREE OF *CYMBIDIUM* 'BABYLON'



Some of my remarks that I shall make when I show you the slides I have chosen to illustrate this short talk on hybrids and species may sound derogatory to modern hybridists. They are, however, meant less to deprecate past work than to encourage greater patience and imagination in contemporary hybridization. There are a great number of what can be termed "hit and miss" crosses made, but fortunately many planned hybrids have also been raised.

A noticeable example of carefully thought out hybridization would undoubtedly be the work done by the late MR. F. C. PUDDLE, V.M.H., so well known to you as the orchid grower to our late President, LORD ABERCONWAY. MR. PUDDLE died before he gave me the full story of his thirty years' work breeding out the spots of *Cypripedium bellatulum* and *C. insigne sanderae*. This he did by the use of a rarer and, to the eyes, less effective form of *insigne*, i.e. *sanderianum*. His work is shown particularly in the lovely hybrid recently produced, which he never lived to see, i.e. 'Festival of Britain', the result of (Grace Darling *g.*) 'Forfarshire' as pollen parent to the F.C.C. form of 'F. C. Puddle' as pod parent.

A GEORGE MOORE medal white cypripedium hybrid raised by another hybridist of repute is *C.* 'Moonchild', which is the result of working on the same *C. insigne sanderae* and *sanderianum*—no less than six times—on the maternal side and on *C. niveum* on the paternal side. Incidentally, two of PUDDLE'S whites are GEORGE MOORE medallists. The make-up of one of them, 'F. C. Puddle', is perhaps worth noting:



Other notable and imaginative hybridists of cypripediums were most certainly the late MR. FLORY and MR. BLACK. As a result of their work, their successor MR. PETER BLACK, is now showing the Orchid Committee astoundingly fine cypripediums such as (London Wall *g.*) 'St. Pauls', awarded an A.M. by the R.H.S. in 1951, and, since then, several even finer but unawarded clones. To my mind, these particular hybrids are magnificent but over-large.

Another hybridist, on whose work no spotlights have yet been focused, is MR. CLIVE COOKSON, who has raised the finest really red calanthes I have ever seen, which were once known under the stud name 'Hexham' and were derived mostly from *C. vestita rubra-occulata* through 'Angela'. This fine strain has, alas, been all but extinct since the war.

The late MR. MCBEAN has also worked hard on the red coloured cymbidiums. That work has really been centred on the use of a *giganteum* form which gave the famous (Rio Rita *g.*) 'Radiant'. But I doubt whether anybody today would have the courage to make a cross with a *C. giganteum*.

Another hybridist who has done a tremendous amount of work on lycastes is the late SIR JEREMIAH COLEMAN.

Another matter that interests me very much is miniature orchids. There has been a tendency to concentrate in a rather vulgar way on large, heavy-textured orchids and not to bother about the much more beautiful smaller-flowered and freer flowering cymbidiums. In fact, you will find that nearly all the finest and biggest forms do not flower very freely, eight or nine being the maximum to the spike, whereas when I speak of free-flowering I mean twenty-five. Unfortunately, there are only three outstanding miniature cymbidiums that I know of today. These are 'Minuet' (Fig. 80), a *pumilum* cross, 'Jewel', a *tigrinum* hybrid and 'Jean Brummit', a *devonianum* cross. All three are primary hybrids raised between 1932 and 1944, from which date, as far as I know, no secondary crosses have been flowered. Strangely enough, two have received recognition by the Orchid Committee. These miniatures are surprisingly consistent. Of the 'Minuet' A.M. I acquired several plants on the day it was given its award, and I have seen several plants in the West Country, and always with the same lovely small rich pink flowers and dwarf in habit but very free-flowering.

This cymbidium, by the way, was raised by STANLEY ALEXANDER, whose friendship I had the privilege of sharing, and not by his better-known father, as stated in an American paper recently. STANLEY spoke to me about it at the time, and said of it, "At least you will like this one orchid when you come to see us"—and that was the one to which he was referring. I saw it six years ago, when I bought it—and I like to think it was the only orchid that had received an award that MR. ALEXANDER ever sold for under £100 in his life. I am very proud that we still have divisions of it. It is a lovely orchid! It is an interesting thought that today in the United States, where the mighty waxy 5-inch Alexanderi 'Westonbirt' hybrids fetch as little as 40 cents a flower, little 'Minuet', with its lovely rich pink spikes, is selling at nearer a dollar a bloom.

I think that the turn of the tide was started some four years ago by that most delightfully frank and charming of all ladies who rarely misses Chelsea, and who was being shown by my brother the magnificent *Cymbidium* 'Princess Elizabeth'; she turned from it and pointed to one of her choice, a self-coloured, small-flowered, long-sprayed *lowio-concolor* hybrid and said, "I much prefer that". HER MAJESTY THE QUEEN MOTHER really had the right idea; she was not too keen on the large, heavy-flowered cymbidium, and she was probably thinking of the beauty of the old-fashioned hybrid.

We ourselves have, in only three generations, produced our fine early flowering *C.* (Santa Barbara *g.*) 'Spinel', (Albania *g.*) 'Gold Dust' and (Early Bird *g.*) 'Pacific', to mention only three *erythrostylum* hybrids which have been given awards since the war.

There is, of course, an excuse for the contemporary hybridist, namely, the time factor. To grow an orchid today is a very expensive business, except in such places as Hawaii, where there is such a happy climate that

MEDICINAL PLANTS

FIG. 73—*Iris florentina*, from a plate in one of the early issues of the *Botanical Magazine* (See p. 255)

Photo, J. E. Downward

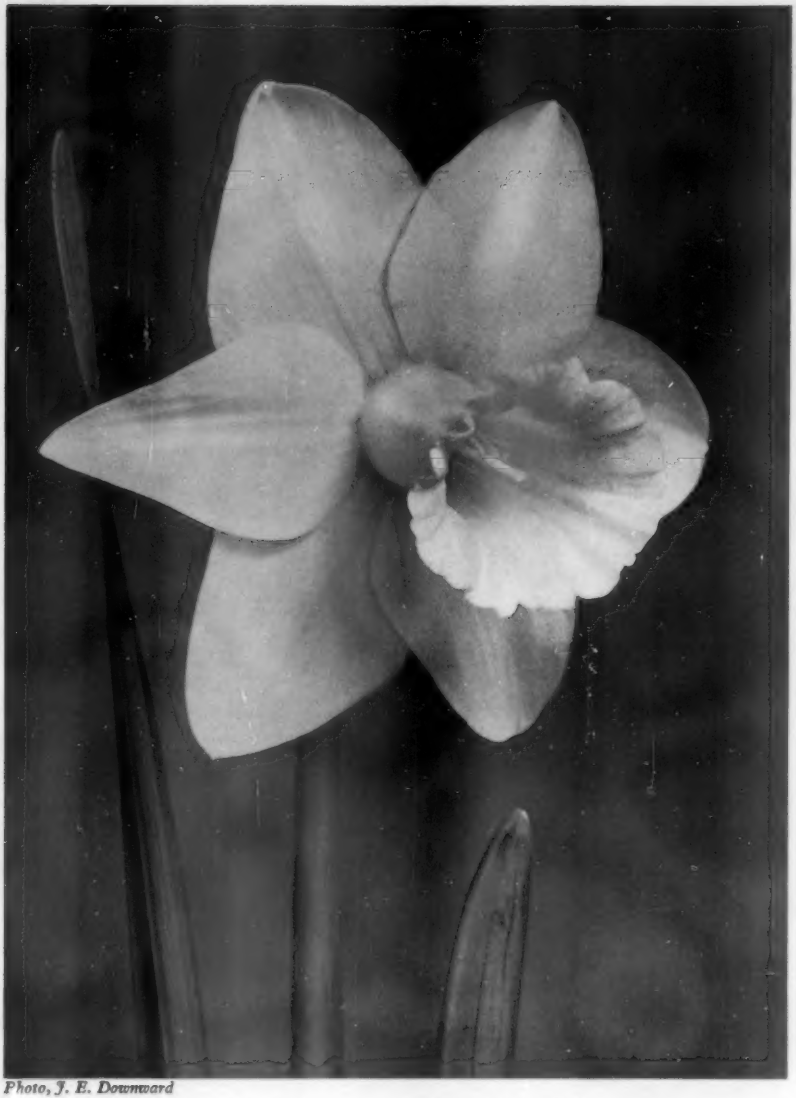
FIG. 74—The Cherry Garden at Wisley. An avenue of *Prunus yedoensis* in mid-April

Photo, J. E. Downward

FIG. 75—Messrs. R. C. Notcutt's exhibit of flowering cherries and shrubs for which a Gold Medal was awarded at the R.H.S. Show held on March 27, 1956

Photo, J. E. Downward

FIG. 76—*Camellia japonica* 'Hana Fuki', which was given an Award of Merit at the R.H.S. Show held on March 27, 1956. Shown by The Commissioners of Crown Lands (See p. 281)

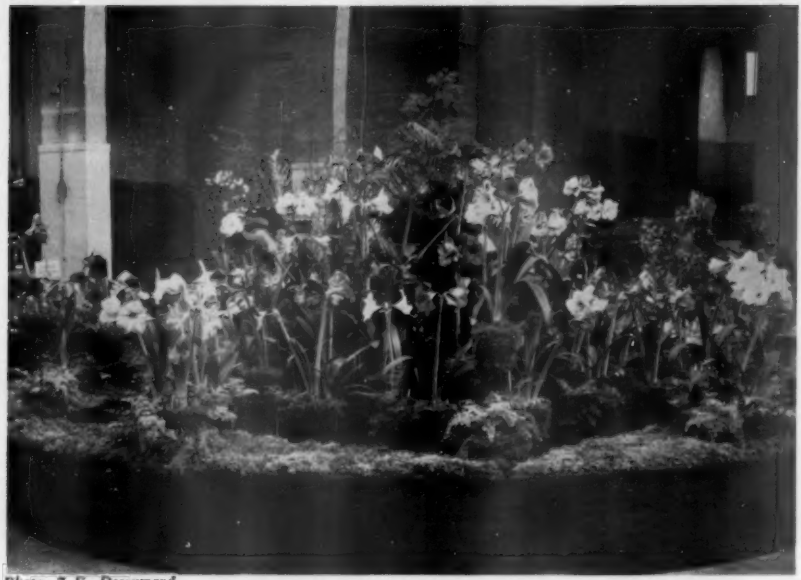


Photo, J. E. Downward

FIG. 77—The bloom of *Narcissus* 'Cantatrice', exhibited by MR. F. D. B. COBB, which was judged to be the best bloom shown in the competitive classes at the Daffodil Show on April 17 and 18

Photo, T. C. Clare

FIG. 78—*Cyclamen orbiculatum* var. *coum roseum*. An unusually fine pan shown by MR. TORTONESE, of Gloucester, at the exhibition of the Birmingham Group of the Alpine Garden Society. This plant was lifted from the open ground early in March. An Award of Merit was recently given to a pan of *Cyclamen orbiculatum* var. *coum*



Photo, J. E. Downward

R.H.S. SHOW, APRIL 17, 1956

FIG. 79—An unusually fine group of hippeastrums shown by CLIVE COOKSON, ESQ., of Hexham. This group was awarded a silver-gilt Lindley Medal

FIG. 80—*Cypripedium* 'Minuet' in the centre with two larger cypripediums for comparison (See p. 266)

Photo, A. Smith

FIG. 81—Apple 'Bramley's Seedling'. The original tree photographed in May, 1955, at Bramley Tree Cottage, Southwell, Notts. (See p. 277)

one can reckon on the flowering of phalaenopsis from seed in three years and vandas in just over three years, and in Singapore they are getting the period down to three years. The optimum in this country is five years for the genera *Cymbidium* and *Cattleya*, and the average is nearer six years or seven and possibly seven and a half years. So we have to wait a long time and to be prepared to skip between ten and fourteen years if we want to look two generations ahead.

I should mention here the enormous strides that have been made by the Americans fortunate enough to enjoy the Hawaiian climatic conditions. Great work has also been done by the Singapore Botanic Gardens, greatly aided by MR. JOHN LAYCOCK, perhaps the oldest hybridist in the Far East, and latterly by MRS. GRACIA LEWIS, whose fine *Vanda* 'Tan Chay Yan' startled us all at Chelsea last year with a unanimous F.C.C. Actually the glory of this outstandingly fine cross must go to my friend, MR. ROBERT TAN, an Oxford graduate and orchid fancier of imagination. Even so, only three new *Vanda* species have been introduced in the new *Addendum III*.

Affinity of orchid species is very important. There is a great lack of knowledge amongst hybridists of this affinity. Rarely do we study their family trees. *Sobralia*, for example, if one could discount the habit of the plant, is to all intents and purposes a *Cattleya*. So looks the flower. In fact, it is closely related through *Neottieae* to *Stenorhynchus*, at least taxonomically, and does not cross with *Cattleya*. *Stenorhynchus* is practically synonymous with *Spiranthes*, and to carry the matter towards absurdity, but truth, *Spiranthes aestivalis* is the miniature white, scented, hardy orchid we all know so well. It is found all over Sussex, and indeed all over the whole Northern Hemisphere! Cross them? Has anyone tried? Yet *Stenorhynchus speciosum* is a fine and showy plant.

Why has no one crossed *Cypripedium calceolus* with *C. reginae*? *Cypripedium delenatii* with a tetraploid *insigne*? *Cycnoches chlorochilon* with a yellow *Stanhopea*? *Brassavola digbyana* with *Sophronitis grandiflora*? A *Coelogyne* with a *Pleione*? Just think of a pink *Coelogyne*! It could be. In fact, all the above, and hundreds more, are, to my mind, most desirable crosses.

PROFESSOR HOLTUM: I enjoyed very much seeing the pictures that MR. SANDER has shown us, most of them being of orchids that do not do so well in Singapore. The kinds that we have to grow and develop there as hybrids are those that need the full strength of the tropical sun. The same sun is almost overhead everyday throughout the year. Our most successful orchids are those that need that, and which do not, therefore, flourish so well under greenhouse culture in this country.

I would like to say that, during the last twenty years, starting with the stimulus provided by MR. JOHN LAYCOCK, we have produced an enormous number of quite new garden plants by hybridizing orchids. In the tropics, where one cannot grow a great proportion of the ordinary garden plants, this has made a tremendous change in the appearance

of gardens, and this is very noticeable in Singapore. There are many people there now who are very keen and very good growers, and I think they can challenge growers anywhere else.

It has been a wonderful experience to see this development, as I have seen it. As I first remember orchids in Singapore, there was, I believe, only one hybrid that was locally grown and the change has been tremendous.

THE CHAIRMAN: A friend of mine from Singapore not long ago told his boy, just before leaving, to plant some *Vanda* orchids to form a short hedge in his garden. He was away from his garden for about six months, I believe, but on returning he found not only that short hedge but a hedge round the whole garden, because the boy had cut the plants off to a certain height and stuck the cut-off parts in—and that is how they grow in that part of the world. They are wonderful growers, and they have altered the face of gardening in the Far East.

I am sure that you will all wish to join me now in expressing our grateful thanks to MR. SANDER for his interesting talk and the fine slides that he showed us.

CONTROL OF PESTS OF VEGETABLE CROPS

D. W. Wright

(*National Vegetable Research Station*)

(*Lecture given on November* 29, 1955; DR. H. V. TAYLOR, C.B.E., V.M.H., *in the Chair.*)

THE damage caused by insect pests to vegetable crops amounts to many millions of pounds every year. Insects not only stunt or kill the plants, therefore directly reducing the yield, but they often seriously affect the appearance and quality of the crop, features which are of outstanding importance with vegetables.

In this account only four of the more common pests of vegetable crops are discussed and some of the most recent findings on methods for their control given. Although most of the control measures described are based on the use of insecticides, it should not be forgotten that good growing conditions and proper crop rotations can do much, either to reduce the effect of an insect attack, or to keep the crop healthy. Thus eelworm diseases, which cause so much damage to potatoes, beet and peas become a problem where there has been a lack of proper crop rotations or where cropping with susceptible crops has been too frequent. Certain pests, however, are widespread and regular in occurrence and, despite good crop husbandry, require the use of insecticides if serious

damage is to be prevented. Several pests of this type will now be considered.

THE CABBAGE ROOT FLY

The cabbage root fly is a widespread pest of brassica crops in Britain and causes considerable losses almost every year. Cauliflowers probably suffer more than any other crop since not only are they very attractive to the fly, but their growth is more easily upset and their powers of recovery are less than crops such as Brussels sprouts and cabbage.

The damage is done by the larvae or maggots feeding on the roots and partially or completely destroying them. Heavily attacked plants make little growth, wilt readily and often fall over through lack of root support. The leaves become a dull leaden colour and usually develop yellow or purplish areas.

The effect of cabbage root fly on cauliflowers depends on both the severity of attack and the state of development of the plants at the time of attack. An attack early in the growth of the plant may result in death, in premature hearting (buttoning) or in stunting. Where the attack occurs later, stunting is the more common result. The losses caused by this pest are greatly underestimated if they are based only on the numbers of plants killed or obviously stunted. In crops where about 10 per cent. of the plants were obviously affected, examination has shown that more than 90 per cent. of the remainder were also infested by maggots at the roots. Where insecticides were used and root fly attack prevented, the general vigour and yield of these crops was greatly increased.

During the past five years a series of twenty-five field trials has been carried out in four of the main vegetable growing areas in England. In these, the average increase in yield resulting from the control of root fly has been 93·5 per cent. with summer cauliflowers, 73·7 per cent. for summer cabbage and 41·6 per cent. for autumn cauliflowers. The largest increases have occurred with crops growing under dry soil conditions whereas, when the soil was very moist, as during seasons of high rainfall, the increases in yield were comparatively small. It would seem that under dry conditions in the soil, a damaged root system is unable to provide the plant with an adequate supply of water. The plant wilts and the foliage takes on a highly waxed and leaden appearance, all of which are symptoms of water shortage. Where soil water is abundant, however, the damaged plant has comparatively little difficulty in making good its moisture requirements. It follows that on soil with a high moisture-retaining capacity, plants damaged by root fly have the best opportunity of overcoming this handicap.

Recent work has shown that aldrin, dieldrin and lindane are all very effective against this pest. They are not all equally suitable, however, for the treatment of crops in different stages of growth, mainly because of differences in phytotoxicity. Furthermore, the way in which they may be most effectively applied varies with the age of the crop and the way in which it is being grown.

Control of Cabbage Root Fly on the Transplanted Crop

The most serious form of damage caused by this pest is on the newly transplanted crop. It may be prevented, however, by either dipping the roots and lower part of the stem into an insecticidal solution before transplanting, or by applying a dust or drench containing insecticide to the soil immediately around the plant after setting out.

Dipping, although cheaper to carry out, usually gives a less complete control of root fly, than a drench treatment. In addition, if conditions for transplanting are not good, a growth check is liable to result. Growth checks may occur from dipping in water alone and result in crop harvest being delayed for several days. Although aldrin, dieldrin and lindane have all proved effective as dips, lindane is liable to be very phytotoxic at the concentrations required to give a satisfactory control.

Both dieldrin and aldrin may be used effectively at much lower concentrations than lindane with little risk of plant damage. The concentrations which have given satisfactory results in dips at Wellesbourne are aldrin 0·08 per cent. and dieldrin 0·06 per cent.

With brassica crops treated in the field after transplanting, the accuracy of application of the insecticide is important in determining the level of control achieved. Field experiments have shown that accuracy is greater with liquids than with dusts and in the equipment developed at Wellesbourne the spray tank is tractor mounted, and fitted with two trigger tap lances so that one row of plants may be treated by an operator with each lance as the machine moves slowly across the crop. The insecticide in solution is applied at low pressure through a coarse nozzle—about $\frac{1}{4}$ inch in diameter—and approximately $\frac{1}{8}$ pint of the fluid is directed to the base of each plant.

When only a relatively small number of plants have to be treated the insecticidal solution can be effectively and quickly applied from a measure by hand. One application is sufficient to protect the crop throughout its growing period.

Suspensions and emulsions of aldrin and dieldrin and suspensions of lindane have all been found to give very high levels of root fly control when used in this way. The minimum concentrations which give effective control are aldrin 0·04 per cent., dieldrin 0·03 per cent. and lindane 0·02 per cent. The aldrin and dieldrin concentrations are just half as strong as those given previously for the dips.

It is most important to apply the insecticide before the root fly attack begins, since most of the insecticides used are toxic, mainly to the eggs and young larvae of the pest. In the southern part of Britain root fly adults usually begin to appear about the middle of April and eggs are laid about a week later. Crops set out before the third week of April should be treated in the third week of April. Those set out later should be treated within three days of setting out. If the treatment is delayed and an attack develops, the use of an insecticide may then prove disappointing, since the large larvae are difficult or impossible to kill without damage to the roots.

Plants raised in pots

Plants raised in pots often suffer heavily from root fly after setting out in the field. Although they may be treated after setting out—as previously described—it has been found that root fly attack can be prevented by watering the pots with an insecticide solution shortly before the plants are to be moved into the field. The pots should be stood side by side and the solution sprayed over several times from a watering can with a fine rose. Each pot should be given about $\frac{1}{16}$ pint of the solution and allowing for loss between pots, 2 gallons of solution are sufficient for about 230 pots.

Aldrin, dieldrin and lindane at the concentrations previously given for field application are very satisfactory. Because of the restrictive effect of the pots, the danger of phytocidal effects is greater than with field application. This is particularly the case with lindane formulations where overdosing has been found to cause serious stunting and loss of yield.

The methods of control so far described are based on experiments in which a major consideration has been the accurate placement of the insecticide at the site where it can exert maximum effect. In this way the amount of insecticide needed is reduced to a minimum and only a small area of soil around the plant is treated.

Insecticides may also be broadcast over the land and incorporated into the top 3 or 4 inches of soil. This may be very satisfactory for the control of wireworms or leather-jackets, but unfortunately it kills off a great many other insects in the soil at the same time. Many of these are valuable because they feed on other insects in the soil. Recent work at Wellesbourne has shown that these predatory insects feed on the eggs and larvae of the cabbage root fly and greatly reduce their numbers and therefore reduce the damage that they would otherwise do. In an experiment at Wellesbourne in 1955, aldrin, lindane and DDT were applied to a range of plots and worked into the top 4 inches of soil. Cabbages were then planted and the root fly attack on those plots which had received insecticides was far heavier than where no insecticides had been used. The amounts of lindane and aldrin used—one or two pounds per acre—was not sufficient to kill the immature stages of the root fly but was sufficient to kill a great many of the predatory insects. The root flies were thus able to flourish, since most of their enemies were dead. These and other results indicate that predators play an important part in reducing the populations of root fly and suggest that broadcast applications or high residue levels of insecticides in soil must be avoided if the natural enemies are to play a full and important part in crop protection.

THE CABBAGE APHID

The cabbage aphid feeds on almost all brassica crops and may cause serious damage especially in dry seasons. It causes the leaves to become curled and stunts the plant. On Brussels sprouts it gets into the buttons,

where the cast skins and excreta spoil their appearance and market value. The aphids also spread a virus disease called mosaic which stunts and may kill the plants. Autumn cauliflowers and broccoli may be very seriously affected by this disease.

This pest should be controlled before it has caused serious damage to the crop. The grower should not wait until the crop is nearly mature before treatment is carried out, for the aphids are much more difficult to kill between the leaves of a well-formed sprout button or cabbage than before hearting has occurred.

Control

Sprays containing Schradan give an excellent control. This insecticide is absorbed by the plant and carried to all parts of the foliage which is then poisonous to greenfly for several weeks afterwards. Schradan is also poisonous to man so that workers applying it must use rubber gloves, aprons and face masks. Because it is poisonous and persists in the crop foliage, a certain length of time must elapse between the time of spraying and the time the crop is harvested.

For crops sprayed from April to July, four weeks must elapse before harvesting; for those sprayed during August and up to September 15 a period of six weeks must elapse. No spraying of vegetable crops with Schradan should be done after 15 September because the material disappears from the plant much more slowly in the cool autumn and winter months.

If the crop is to be harvested within a few days or weeks of spraying, nicotine or HETP should be used. Sprays normally give much better results than dusts especially if they are applied at high pressure and in sufficient quantity to give a complete wetting of the plant. Owing to the very waxy nature of both the aphid and the brassica plant more wetting agent is required than for most other crop pests.

THE PEA MOTH

The pea moth is one of the principal pests of field and garden peas in Great Britain. Its larvae feed on the pods causing considerable damage to the developing seeds and give the pod contents a very unsightly appearance. It is most prevalent in the southern part of England, where in the main pea-growing areas it frequently causes severe losses.

The moths are mostly grey-brown in colour and about $\frac{1}{4}$ inch long. They lay their eggs on the leaves and stipules of the plants, and when these hatch the young larvae wander over the plant and eventually bore into pods and feed upon the developing seeds. When they are fully grown the larvae leave the pods and enter the soil, where they spend the winter. The moths usually begin to emerge about the beginning of June and are usually most abundant in the second and third weeks of July.

Peas which are in flower and are maturing over this period normally suffer the heaviest attacks. Severe attacks may be avoided, however, by

either sowing early or late. Crops sown in the latter half of June, or in July, mature after the flight period of the moth and are almost free from attack. Early sowings also largely escape attack provided that the variety chosen is quick in maturing, e.g. 'Kelvedon Wonder'. The heaviest attacks usually occur on sowings made in the latter half of April and in the first half of May.

Chemical control

The pea moth may be controlled by spraying the crop with an emulsion containing ¼ per cent. DDT. The spray should be applied at high pressure and at high volume, sufficient to give a thorough wetting of the foliage. Low volume sprays and dusts have been tested and have failed to give satisfactory results.

With crops which are to be picked green, one spray applied about seven to ten days after the first flowers appear on the crop has been found to give a satisfactory control. Crops which come into flower before the flight period of the moth should not be sprayed until approximately seven days after the moths have begun to emerge. The beginning of the flight period varies considerably from season to season and a method is being devised at Wellesbourne, based on soil temperatures, which it is hoped will enable the beginning of the flight period to be predicted. The method, if successful, should enable the grower to time his sprays more accurately in relation to the time of attack and therefore obtain a more certain and complete maggot control.

Pea crops which are to be harvested dry, require spraying twice with DDT. The first spray should be carried out as for the green picking crop and a second should be applied about fourteen days later at the same concentration and rate per acre. The second spray is necessary to maintain a high DDT cover on the crop and thereby protect the later formed pods.

THE LETTUCE ROOT APHID

The lettuce root aphid is a pest of the summer lettuce crop especially in dry seasons. It has a complicated life-cycle and passes the winter as eggs on the poplar tree. These hatch in the spring and the young aphids develop within large flask-shaped galls produced on the petioles of the leaves. Winged aphids leave these in large numbers in June and July and settle on lettuce, forming colonies of mealy-coloured aphids on the roots. If the soil is dry the aphids increase greatly in numbers and the lettuce wilt and frequently die.

Very little research has been done on the control of this pest. Recently, however, MR. DUNN has begun work at Wellesbourne on this problem. He has found that systemic insecticides, sprayed on to the foliage give little control of the aphids on the roots. Endrin, used as a seed dressing, gave encouraging results, but other insecticides used in this way have proved either ineffective or highly phytotoxic.

Certain varieties of lettuce, however, were found to be highly

resistant to attack. Amongst these the variety 'White Favourite' (an "All the Year Round" type) was outstanding and suffered little damage whilst susceptible varieties nearby were being killed by heavy root aphid attack. Other varieties which were little affected were 'Midas' (a "White Boston" type) and 'Salad Bowl' (a non-hearting leaf type lettuce).

These most encouraging findings indicate that the lettuce root aphid problem may be most satisfactorily solved by the breeding of improved varieties resistant to attack. Work has been started on this project at Wellesbourne.

AWARD OF GARDEN MERIT—XCI

433 PHILADELPHUS 'BEAUCLERK'

Award of Garden Merit, November 1, 1955

Philadelphus 'Beauclerk' is a most beautiful shrub which flowers at the end of June and in early July. It is the result of a cross, made by THE HON. LEWIS PALMER in 1938, with *P.* 'Sybille' as the seed parent and *P.* × *burfordiensis* as the pollen parent. It is a vigorous hybrid with a graceful arching habit making a bush of 6–8 feet in height and width. In this it seems to have struck a "happy medium" between × *burfordiensis*, which grows to a height of 10–12 feet with rather a stiff appearance, and 'Sybille', which is a comparatively dwarf shrub 3–4 feet high.

The flowers are borne in great profusion in rather crowded clusters of five or seven along the arching sprays. They are very large and may be as much as 2½ inches across. At the base of the white petals, which are broad-ovate or orbicular in shape and crimped or notched at the edges, is a pale purple marking. So often new hybrids tend to lose in scent what they gain in form and size; this, however, is not the case with 'Beauclerk' which is very fragrant indeed.

By receiving an Award of Garden Merit this hybrid has now been officially recognized as a really good and reliable plant. Previous to this it received an Award of Merit in 1947 and a First Class Certificate in 1951 when shown by the raiser. Few plants are given three such honours, but 'Beauclerk' is definitely worthy of them and of a place in every garden where there is room. It is hardy and easily propagated from cuttings and may be cultivated in any soil that is not waterlogged.

434 PHILADELPHUS 'SYBILLE'

Award of Garden Merit, November 1, 1955

Philadelphus 'Sybille', with its bushy arching habit, makes a very graceful shrub about 3 feet high and 4 feet wide. The numerous and

fragrant flowers are borne in clusters of two or three on 3-inch laterals all along the main shoots. The white flowers, which are more rectangular than round, may be 2 inches wide and, as in 'Beauclerk', there is a pale purple marking in the centre of each. The foliage with its small and glossy leaves is also attractive. *P.* 'Sybille' flowers in June, which is a point in its favour as in many gardens there seems to be a lull at this time between the early and the late summer-flowering shrubs.

This hybrid received an Award of Merit in 1954 when it was shown by L. MAURICE MASON, ESQ., of King's Lynn. It is an excellent plant for the smaller garden as it more than adequately takes the place of the better-known, but rather larger, *P. coronarius*; the only real virtue of this old favourite being its scent, which 'Sybille' possesses together with many other good points. It will, however, also find a place in the larger gardens, as shrubs of this size and type are frequently needed to make the design more complete. For ease of propagation and culture it differs in no way from any other philadelphus.

P. 'Sybille' was a triploid seedling from the diploid *P. purpureo-maculatus* and its family tree is given by DR. JANAKI AMMAL in R.H.S. JOURNAL, **76**, 272 (1951).

435 LONICERA × AMERICANA

Award of Garden Merit, November 1, 1955

This vigorous climber is probably a natural hybrid of *Lonicera etrusca* and *caprifolium* and is more often found in lists under its synonyms *L. grata* or *L. italica*. It flowers most prolifically during June and July, but even as late as September a few flowers may still be found. The sweetly scented flowers are produced in great numbers in crowded whorls at the ends of the shoots with a few in the leaf axils. They are tubular and about 2 inches long. In colour they are soft purple outside and an apricot shade within. The whole panicle may be as large as 12 inches by 8 inches. The leaves are broadly oval or obovate and are 1–3 inches long, with several of the uppermost pairs joined together.

L. × *americana* is neither new nor rare and, considering it is such an adaptable plant, it seems surprising that it is not more generally grown. The site and aspect seem to matter little to this plant, as it will thrive in any average soil facing north, south, east or west. It is an admirable screen plant and when trained on a trellis, or some similar support, it will hide very effectively any offending drain-pipe or an unsightly garden shed or garage. There are many gardeners who want a climber of this nature and in *L.* × *americana* they may find just the plant they are looking for.

G. E. PETERSON

PLANTS AND PROBLEMS XXIV

RASPBERRIES

Question. My 'Malling Promise' raspberries although having done well for a number of years are now in need of replacement. Is there a good quality variety a little later in ripening than 'Malling Promise', that you can recommend for dessert purposes.

Answer. Another East Malling introduction called 'Malling Jewel' has given excellent results and should suit your requirements. It is mid-season in ripening, is a good cropper and has a good flavour. It is also said to be superior to 'Malling Promise' for jamming and canning.

SOIL ANIMALS

Question. I am enclosing some creatures found in the soil of my vegetable plot. I should like to know whether or not they are injurious.

Answer. The animals found in the soil sample are as follows:

(1) Two wireworms (*Agriotes* species)—the stiff, yellow insect larvae, about $\frac{3}{4}$ inch in length, with three pairs of legs at the front end.

(2) Three centipedes (*Geophilus longicornis*)—yellow creatures about $1\frac{1}{2}$ inches long with legs all along the body—one pair to each segment.

(3) One black millipede (*Tachypodojulus niger*)—black creature about 1 inch in length with legs all along the body—two pairs to each segment. It coils up like a watch spring when disturbed.

(4) Five red velvet mites (*Allothrombium* species)—active, scarlet mites, about $\frac{1}{8}$ inch long with four pairs of legs.

Of these the centipedes and red velvet mites are predaceous and beneficial and, therefore, should be encouraged.

Wireworms are serious pests where plants are being grown on newly broken grassland, especially during the second and third years of cultivation, for in the first year they usually feed on the decaying turf. They remain in the larval stage for three or four years, then when fully fed they pupate and the adult click beetles appear a few weeks later. Eggs are laid in clusters, 2 or 3 inches below the surface. Preference is shown for grassland, cereals or waste land, so providing land is kept under cultivation the wireworm population decreases year by year as the larvae become mature and fly away.

Nowadays, an effective control of wireworms is possible by chemical means and on a vegetable plot $1\frac{1}{4}$ per cent. aldrin dust should be used. It can be broadcast at the rate of 1 ounce per square yard or a light dusting may be applied along the drills or in the planting holes before sowing or planting susceptible crops. The disadvantage of the former method is that it kills both pests and predators over wide areas whereas the more localized technique allows beneficial predators to remain undisturbed in the untreated

areas between the rows. Soil predators are now believed to play a very important part in effecting a natural control of soil pests.

The treatments should be carried out in spring or summer under moist warm conditions when the wireworms are near the surface.

Aldrin also assists in reducing the millipede population.

STRAWBERRY GREY MOULD

Question. I lose a great many strawberries owing to a greyish mould which attacks the fruit. Can I do anything to stop this?

Answer. The Grey Mould disease of strawberries caused by the parasitic fungus *Botrytis cinerea* can cause a great loss of fruit in some seasons. It is usually noticed as a fluffy greyish mouldy growth on the berries as they ripen, but in a wet season may be severe enough to destroy the fruits while they are still green.

For years the only advice on control has been to remove and burn attacked berries as well as dead and dying leaves, to avoid close planting and even to support the trusses on short forked sticks to keep them off the damp soil. Strawing down should not be done too thickly as this may encourage humidity around the berries. In short, most of the remedial measures hitherto have been cultural.

Recently the modern fungicide known as Captan has been said to give a good control of this disease. It can be used either as a spray or as a dust and treatment should be started immediately the first flower petals drop and repeated two or three times at intervals of ten days.

NOTES FROM FELLOWS

Apple 'Bramley's Seedling': The Original Tree

An account of the origin of Apple 'Bramley's Seedling' was given in this JOURNAL in April 1945. The original tree, raised from seed between 1809 and 1813, is in the garden of Bramley Tree Cottage, Church Street, Southwell, Notts., and as may be seen from Fig. 81, thanks to the attention given to the tree by MR. L. LEFROY about ten years ago, it is still comparatively vigorous. The lower part of the trunk, which is in contact with the ground for about 5 feet, is behind the lady's skirt.

A. SIMMONDS

The Willow-Leafed Pear

I wonder if any Fellows have tried raising *Pyrus salicifolia* from seed?

In 1953 I raised plants from the Wisley distribution which were a heterogeneous lot, none resembling their parent except in the down on the leaves.

This interesting result caused me to experiment further, and in subsequent years I have collected and sown seeds from several sources—in each case of the weeping form. The result has been even more surprising, for every seedling that I have raised has had shiny, glabrous leaves with serrate margins indistinguishable from the common pear.

I have found difficulty in tracing any recent account of this "species"—which it surely cannot be. VAVILOV, however, in a paper to the 1930 Horticultural Congress writes that in Azerbaijan, and particularly in Armenia, forests of *Pyrus salicifolia* are to be found. In the same paper he observes that *Pyrus* in nature is propagated seminally and not by suckering.

It is all really rather puzzling.

MILES HADFIELD

Metasequoia glyptostroboides grafted on Cryptomeria japonica

By kind permission of The Director, Royal Botanic Gardens, Kew, the writer obtained two seedling metasequoias and brought them by air to Kenya in September, 1952. These seedlings were planted in tubs in the E.A.A.F.R.O. plant nursery at Muguga. Muguga is some 17 miles from Nairobi at an altitude of 6,800 feet a.s.l., the average rainfall is approximately 45 inches per annum. The rainfall is divided into two seasons, falling chiefly in "the long rains", April to June, and to a lesser extent during the "short rains", October to November. The seedlings have made very slow growth following a steady pattern of "flushing" during the "rains", and shedding their leaves during the ensuing dry seasons. The seedlings are a little over 2 feet at the time of writing.

It was thought that perhaps plants raised from cuttings might make better growth. Several cuttings were rooted in 1953, but like the parent plant, are making slow progress.

In an effort to increase growth rate, the writer decided to try to graft a scion on to a more vigorous species. The only plant to hand belonging to Taxodiaceae was *Cryptomeria japonica*. On May 14, 1955, a leafless leading shoot, some 8 inches long, was taken from one of the original *Metasequoia* seedlings. The leading shoot of a three-year-old *Cryptomeria japonica* sapling about 4 feet high was decapitated about 5 inches below the apical bud. A top cleft graft inserting the *Metasequoia* scion was made. The graft was tied with raffia, not waxed, but the whole graft was enveloped in a "polythene" bag.

Two months later a satisfactory union had been made.

W. B. MAY

Horticulturist,
E.A.A.F.R.O.,
Kikuyu, Kenya.

WISLEY TRIALS, 1955

PARSNIPS

Twenty-three stocks of parsnips were received for trial at Wisley in 1955. The trial was sown on March 15, 1955, in rows 18 inches apart. The plants were thinned to 8 inches apart in the rows.

The trial was inspected by a sub-committee of the Fruit and Vegetable Committee on November 11, 1955, and on its recommendation the Council of The Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Roots intermediate, tapering, wide shoulders

YATES' EVESHAM. (Raised, introduced and sent by Messrs. Yates & Sons (Seeds) Ltd., 3 High Street, Evesham, Worcestershire.) **F.C.C.** November 11, 1955.—Root 4¾ inches wide at the neck, 11½ inches long, regular, clean; neck hollow; little core; a very broad-shouldered heavy stock. [12]

HOLLOW CROWN. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading, Berkshire.) **A.M.** November 11, 1955.—Roots 3½ inches wide at the neck, 12 inches long, regular, clean; neck hollow, little core. [16]

IMPROVED MARROW. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 26–29 Drury Lane, Covent Garden, London, W.C.2.) **A.M.** November 11, 1955.—Root 4 inches wide at neck, 15 inches long, regular, clean; neck hollow, little core. [15]

TRIBUTE. (Raised, introduced and sent by Messrs. J. E. Ohlsens Enke, Linnesgade 14, Copenhagen, Denmark.) **A.M.** November 11, 1955.—Root 4½ inches wide at neck, 12 inches long, regular, clean; neck hollow, little core. [14]

LISBONNAIS SELECTED. (Sent by Messrs. W. Deal & Sons Ltd., Kelvedon, Essex.) **H.C.** November 11, 1955.—Root 3¾ inches wide at neck, 11½ inches long, fairly regular, clean; neck hollow, little core. [17]

SWEET CORNS

Ten stocks of sweet corns were received in 1955 for trial at Wisley. The trial was sown on May 17, 1955, in the open ground. The rows were 27 inches apart, and the seeds 12 inches apart and 1½ inches deep in the rows. This spacing was sufficiently close to allow effective cross pollination.

The trial was inspected by a sub-committee of the Fruit & Vegetable Committee on September 8, 1955, and on its recommendation the Council of The Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

FOREMOST EARLYONE. (Raised, introduced and sent by Messrs. Ferry-Morse Seed Co., Mountain View, California, U.S.A.) **A.M.** September 8, 1955.—Plant 5½ feet high; cobs 7 inches long, 2 inches wide, 2 per plant; seeds ⅝ inch wide, ½ inch long, creamy yellow, sweet, fourteen rows on a cob; earliest strain in the trial, ready on August 20. [2]

GARDEN GOLD. (Raised, introduced and sent by Messrs. Ferry-Morse Seed Co.) **A.M.** September 8, 1955.—Plant 6½ feet high; cobs 5½

inches long, 1¾ inches wide, four per plant; seed ⅝ inch wide, ½ inch long, yellow, sweet, twelve rows on a cob; ready August 28. [5]

GOLDEN EMBLEM. (Raised, introduced and sent by Messrs. Ferry-Morse Seed Co.) **A.M.** September 8, 1955. Plant 6 feet high; cobs 6 inches long, 1¾ inches wide, three per plant; seeds ½ inch wide, ⅝ inch long, yellow, sweet, ten rows on a cob; ready August 28. [6]

CANADA CROSS. (Raised by Dr. C. D. R. Dawson, introduced and sent by Messrs. A. L. Tozer Ltd., Pyports, Cobham, Surrey.) **H.C.** September 8, 1955.—Plant 5½ feet high; cobs 7 inches long, 1¾ inches wide, three per plant; seeds ⅝ inch wide, ½ inch long, creamy-yellow, sweet; ready August 24. [1]

GOLD STAR. (Raised, introduced and sent by Messrs. Corneli Seed Co., 101 Chouteau Avenue, St. Louis 2, Mo., U.S.A.) September 8, 1955.—Plant 6 feet high; cobs 6 inches long, 2 inches wide, three per plant; seeds ½ inch wide, ½ inch long, deep yellow, sweet; ready August 28. [8]

VEGETABLE MARROWS

Twenty-six stocks of vegetable marrows were received in 1955 for trial at Wisley. The seed was sown in the open ground on May 17 and 18, 1955; the bush marrows spaced 3 feet apart and the trailing ones 6 feet apart. Three seeds were sown in each position and the resulting seedlings were thinned to one at each position.

The trial was inspected by a sub-committee of the Fruit & Vegetable Committee on August 3 and September 8, 1955, and on its recommendation the Council of The Royal Horticultural Society has made the following awards.

The number in brackets after the description of the variety was that under which it was grown in the trial.

Bush varieties

BUSH GREEN SELECTED. (Sent by Messrs. A. L. Tozer Ltd., Pyports, Cobham, Surrey.) **A.M.** August 3, 1955.—Fruit 12 inches long, 4¾ inches diameter, cylindrical, dark green striped light green, mottled with creamy-yellow. [8]

HEAVY YIELD. (Raised, introduced and sent by Messrs. G. R. Vatter Seeds Ltd., Berne, Switzerland.) **A.M.** August 3, 1955, as an early variety for the private garden.—Fruit 12 inches long, 4 inches diameter, cylindrical, light green much speckled with creamy-yellow. [11]

IMPROVED GREEN BUSH. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading, Berkshire.) **A.M.** August 3, 1955.—Fruit 9 inches long, 4½ inches diameter, cylindrical, dark green, mottled with light green, light green stripes mottled with creamy-yellow. [2]

BRETIGNY GREEN BUSH. (Raised, introduced and sent by Messrs. L. Clause S.A., Bretigny-sur-Orge, (Seine et Oise), France.) **H.C.** August 3, 1955.—Fruit 11½ inches long, 4 inches diameter, cylindrical, dark green mottled with light green. [6]

BRETIGNY GREY BUSH. (Raised, introduced and sent by Messrs. L. Clause S.A.) **H.C.** August 3, 1955.—Fruit 12 inches long, 4½ inches diameter, cylindrical, light green, heavily mottled with creamy-yellow giving the appearance of grey. [3]

BUSH GREEN SELECTED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd., 26–29 Drury Lane, Covent Garden, London, W.C.2.) **H.C.** August 3, 1955.—Fruit 12 inches long, 4 inches diameter, cylindrical, dark green mottled light green, light green stripes. [10]

DARK GREEN ZUCCHINI. (Raised, introduced and sent by Messrs. Ferry-Morse Seed Co., Mountain View, California, U.S.A.) **H.C.** August 3, 1955.—Fruit 13 inches long, 3 inches diameter, cylindrical, very dark green. [12]

SUPERLATIVE. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd.) **H.C.** August 3, 1955. Fruit 13 inches long, 4 inches diameter, cylindrical, very dark green, very faintly mottled with light green. [5]

TENDER AND TRUE. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd.) **H.C.** August 3, 1955, as a variety for the private garden. Fruit 4 inches long, 7 inches diameter, flattened globular, green speckled yellow. [1]

Trailing varieties

PERFECT CREAM TRAILING. (Raised, introduced and sent by Messrs. Yates & Sons Ltd., Evesham, Worcestershire.) **A.M.** September 8, 1955.—Fruit 10 inches long, 4½ inches diameter, cylindrical, pale yellow. [24]

TABLE DAINTY. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd.) **A.M.** September 8, 1955. Fruit 8½ inches long, 4 inches diameter, cylindrical, dark green striped yellow. [18]

FELTHAM PROLIFIC. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **H.C.** September 8, 1955. Fruit 12 inches long, 4½ inches diameter, cylindrical, pale yellow. [23]

LONG GREEN TRAILING SELECTED. (Raised, introduced and sent by Messrs. Watkins & Simpson Ltd.) **H.C.** September 8, 1955. Fruit 14½ inches long, 5 inches diameter, cylindrical, dark green striped with pale green. [21]

LONG WHITE. (Raised, introduced and sent by Messrs. Sutton & Sons Ltd.) **H.C.** September 8, 1955. Fruit 11 inches long, 4¾ inches diameter, cylindrical, creamy-yellow. [25]

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1956

Camellia japonica 'Hana-Fuki' A.M. March 27, 1956. This attractive flowering shrub was imported by the exhibitors from Japan in 1938 (Fig. 76).

On the specimens shown, the leaves were closely edged with small, singularly sharp-toothed serrations while, in general, the foliage was small, having regard to the size of the flowers. In turn, these were large, Semi-Double, shallow cup-shaped and had a prominent, loose cluster of stamens—a few of which were slightly petaloid—in the centre. About fifteen petals of good substance made up each flower and were prominently veined against a pleasing shade of Neyron Rose (H.C.C. 623/2). Exhibited by Commissioners of Crown Lands, Windsor Great Park, Berks.

Eranthemum pulchellum, A.M. January 24, 1956. A winter-flowering shrub for the warm greenhouse. It has large, opposite,

elliptic, dark green leaves and panicled spikes producing a succession of small French Blue (H.C.C. 43/1) five-petalled flowers. It has also been known as *Daedalacanthus nervosus* and is figured at t. 1358 of the *Botanical Magazine* as *Justicia nervosa*. Exhibited by The Director, Royal Botanic Gardens, Kew.

Narcissus 'Tête à Tête' A.M. February 28, 1956, as a variety for cultivation in pots or pans. A sturdy, large-cupped, *cyclamineus* hybrid, with a flower about 2 inches in diameter, borne on a 7-inch stem. The Mimosa Yellow (H.C.C. 602) perianth segments, which were only slightly reflexed, were about ¾ inch long and up to ⅝ inch broad. The Buttercup Yellow (H.C.C. 5/1) cylindrical corona was ⅝ inch long and ⅝ inch in diameter at its crenated and slightly expanded mouth. This charming little plant was raised from a self-pollinated flower of 'Cyclataz' and exhibited by Mr. Alec Gray, Treswithian Daffodil Farm, Camborne, Cornwall.

ORCHIDS

Cypripedium (Daiboth g.) 'Stonehurst' A.M. January 24, 1956. A large-flowered cultivar which is a product of the cross *C.* 'Balaclava' and *C.* 'Felbridge'. The plant exhibited possessed a bloom nearly 6 inches by 6 inches. The large flat dorsal and the horizontally placed laterals are of colours typical of a large number of cultivars of this genus. The dorsal, for instance, has deep maroon spots upon a white and green background, whilst the laterals have brown superimposed upon greenish-yellow, especially on the upper half. Basal spotting is also present upon these tepals. The labellum is glossy brown-maroon. Exhibited by R. Strauss, Esq., Stonehurst, Ardingly, Sussex.

Cypripedium (Desert Song g.) 'Stonehurst' A.M. January 24, 1956. This cultivar is one of the progeny resulting from *C.* 'Desert Sun' × *C.* 'Mem. W. H. White'. It has a medium-sized bloom with an incurving dorsal tepal and downward sloping, sinuately margined, lateral tepals. Two flowers were present upon the plant exhibited. The laterals and labellum are pale glossy yellow with a slight green flush, the latter enhanced by the large, lower, outer tepal. Exhibited by R. Strauss, Esq., Stonehurst, Ardingly, Sussex.

Cypripedium (Dione g.) 'Stonehurst' F.C.C. January 3, 1956. The parentage is *C.* 'John Dovan' × *C.* 'Edenbridge'. The plant exhibited bore a flower 5½ inches by 5 inches. The tepals are flat, with the laterals held at right angles to the nearly square dorsal. The latter tepal is glossy purple paling to an irregular whitish margin. The laterals and labellum have the same purple colour superimposed on a yellowish background. The lower half of the laterals is heavily spotted. The normally unattractive, lower, outer tepal is purplish with a large oval, sharply defined, pale green area in the middle. Exhibited by R. Strauss, Esq., Stonehurst, Ardingly, Sussex.

Cypripedium (Douce Confidence g.) 'Grandeur' A.M. January 3, 1956. A large-flowered cultivar, with a bloom 6 inches wide

by 5 inches long, on the plant exhibited. The laterals are especially long, and are brownish yellow with some basal spotting, while the margins are strongly undulated. The large concave dorsal is white with a green centre upon which the usual glossy purple dots are prominent. The labellum appears rather flat and is a glossy purplish brown. The parentage is *C.* 'Euryostum' × *C.* (Chatwode *g.*) 'Mastiff'. Raised and exhibited by Messrs. Black & Flory Ltd., Slough, Bucks.

Cypripedium (Maia g.) 'Stonehurst' A.M. January 3, 1956. A flattish-flowered cultivar obtained by crossing the well-known *C.* 'Balaclava' with *C.* 'Mem. F. M. Ogilvie'. The dorsal and laterals are noticeably rounded towards the apex. Purple blotches on a white and green background constitute the colour of the dorsal. The laterals have a deep brownish-red upper half, and a paler, spotted lower half, the two areas being well demarcated. The brownish-purple labellum is strongly declined. Exhibited by R. Strauss, Esq., Stonehurst, Ardingly, Sussex.

Cypripedium (Prinny g.) 'Whatcroft Hall' A.M. January 3, 1956. This is a cultivar which achieves its main distinction from the large white and green dorsal. Prominent dark glossy purple blotches are present on this. The basic colour of the incurving laterals is a purplish colour superimposed on to yellowish green, with prominent spots towards the base. The similarly coloured labellum is surmounted by the usual translucent yellow column. The parentage is *C.* 'John Keeling' × *C.* (Regent *g.*) 'Magnificum'. Exhibited by Dr. W. Stirling, Whatcroft Hall, Northwich, Cheshire.

Cypripedium (W. N. Evans g.) 'Rose Queen' A.M. January 3, 1956. This cultivar is rather smaller flowered (4½ inches by 4 inches) than many, and was obtained by crossing *C.* 'Floralies' and *C.* 'Kay Kay'. The flattish dorsal is purplish with a broad irregular white margin. It is finely spotted towards the base where it is also mixed with pale green. The laterals and labellum are more or less brownish red, while the former tepals have a prominent dark central streak and a lower yellow margin. As usual the flower is very glossy. Exhibited by Messrs. Black & Flory Ltd., Slough, Bucks.

BOOK NOTES

"The Pocket Guide to Wild Flowers." By David McClintock and R. S. R. Fitter, assisted by Francis Rowe. 340 pp. Illus. (Collins, 1956.) 25*s*.

There seems no end to the publication of books dealing with the British flora, or more accurately with the flowering or seed-bearing plants of the British Isles and designed for the beginner. Many of these books are incomplete in that they deal with a selection only of the species composing our flora. Some of them also are inaccurate in many details and poorly illustrated. None of these unpleasant features can be found in the work here reviewed. The authors, artists, and publishers have "done a good job" within the set limits of the main purpose which is "to enable anybody to name any wild flower, grass, sedge, tree or shrub that he or she is reasonably likely to see in the British Isles".

There are many interesting features in this book. Most of the illustrations, coloured and uncoloured, are very good, though, of course, one could complain that several of them might be better. It would have been advantageous to have had all of them in colour even if this added another five to ten shillings to the price of the book. Fruits and seeds are rarely shown except for a few special groups like the umbellifers, rushes, and sedges, and then as text figures. Might one suggest a companion volume under the title "A pocket guide to wild fruits and seeds"? For a popular work, the standard of reproduction of the plates is high.

In the text there are numerous "tips" to quick and easy determination. Such devices include various special and general keys. These are not of the dichotomous type but group the plants in major divisions and in paragraphs with common characters given as headings. These characters have been chosen with care as being easily determined, mostly at a glance with the naked eyes. The descriptions, or rather diagnoses, are fairly adequate and in very simple language.

Throughout the book, preference is given to English names. Some of these are decidedly unfamiliar and may well be of very modern manufacture. Latin names are provided in the general text with the diagnoses. These names are up to date and some of them appear to be published here for the first time, at least in a British flora.

The general text is arranged under families which are in a sequence similar to that in Clapham, Tutin, and Warburg's *Flora of the British Isles*, 1952, with deviations. The plates, however, are arranged by a scheme based on flower colour. The plants with blue, violet, purple, red, pink brown, and yellow are, roughly, in this sequence in the sixty-four coloured plates, and plants with white and green flowers are figured in the uncoloured plates or in black-and-white outlines in the text. There is a simple glossary and indexes to English and Latin names.

W. B. TURRILL

"More for Your Garden." By V. Sackville-West. 176 pp. Illus. (Michael Joseph.) 15*s*.

This is the third collection of Miss V. Sackville-West's weekly articles in the *Observer* that I have had the pleasure of reviewing, and a very great pleasure it is. Miss Sackville-West writes for every gardener, be his ground great or small, and this volume, like its predecessors, abounds in wit, wisdom, garden lore and precept, and classical and literary allusion.

One article, however, prompts wider reflections. On April 26, 1953, Miss Sackville-West writes that she has just spent two days wandering round some of the gardens of Cornwall and records some of the glorious plants she has seen. "Not for me in South-east England, I fear," she writes, "and not for me the extraordinary lushness and exuberance of vegetation in the tender climate; . . ." Miss Sackville-West has shown in these articles over the years how gardens in less-favoured parts of the country may be just as interesting and profuse, and how a tumultuous amplitude of blossom and luxuriance and pattern of foliage may be created in less-propitious climates by the careful selection of plants, and skill and understanding in growing them. She has therefore, I think, done much more than provide distinguished horticultural Sunday morning diversions, much as we shall continue to look forward to them.

MORTON

"Propagation of Horticultural Plants." By Guy W. Adriance and Fred R. Brison. Second edition. 298 pages. Illus. (McGraw-Hill Book Company Inc., New York, Toronto, London, 1955.) $6·50.

This illustrated book of sixteen chapters is written mainly for use in the U.S.A. but contains much valuable information for all students of plant propagation. The range of Horticultural Plants is almost restricted to those of a woody nature but a chapter on bulbs and other modified structures is included. The book begins and ends well, the authors are to be commended for giving four chapters at the beginning of essential basic knowledge including the structure of plants, and to round off at the end with a chapter each on Transplanting and Pruning. In the remaining ten chapters the various methods used to increase plants are dealt with in detail.

At the end of each chapter is a list of questions and I am certain I will not be alone in being unable to resist reading these first of all to find out if reasonable answers can be provided. Suggested references on the specialized subjects are given but these are confined almost entirely to American works and in one which refers to East Malling (page 131), "R. J. Gardner" should read "R. J. Garner".

F. P. KNIGHT

"South African Flowers for the Garden." Sima Eliovson. xix + 306 pp. Illus. (Cape Town: Howard Timmins, 1955.) 75*s*.

At the end of the eighteenth and beginning of the nineteenth centuries a great variety of South African plants were in cultivation in Europe. With certain notable exceptions, many of these subsequently disappeared. Within recent years there has been something of a revival. If any stimulus to such revival of interest is needed, this rather sumptuous volume, with its wealth of illustration, both coloured and black-and-white, should go far to bring to the notice of horticulturists and others some of the glories of the South African flora.

While the book is written primarily for the gardener in South Africa, its simple direct style and very numerous illustrations should give it a very much wider appeal.

The book is divided into two parts. The first deals with the flora in general, its history in the garden, and notes on its cultivation. There are chapters on growing from seed, on the growing of bulbs, of annuals and perennials, of shrubs and trees, and of succulents. The last are treated throughout as decorative plants and not at all as curiosities for the special garden. There is also a chapter on the planning and lay-out of the garden, accompanied by lists of species arranged in accordance with special requirements, colour, season of flowering, etc. There are several diagrams for suggested arrangements. This portion should be of special interest to the practical cultivator. There are, further, notes on special aspects such as rockeries, water gardens, and so forth.

The second and larger part comprises descriptions of the plants, with notes on their requirements and means of propagation and cultivation. The plants are divided into four sections: bulbs, annuals and perennials, shrubs and trees, and decorative succulents. Under each the plants are arranged alphabetically under their scientific names. Popular names are given for the great majority. While no attempt has been made to create popular names for every species, some of those given seem just translations of the Latin ones. There is a full index in which both Latin and popular names are included. In the case of the Latin names, a real attempt has been made to bring them into line with recent work and with the International Rules for Botanical Nomenclature. In those cases where a well-established name is rejected, this is quoted.

The volume is very fully illustrated by photographs, both colour and black-and-white. The majority of these are of excellent quality and their presence greatly enhances the value of the book, especially for those not familiar with the flora. Each photograph has a reference to the page where the description occurs, and vice versa. In addition, for species which are not illustrated, there is, where possible, a reference to a figure in a well-known work.

As a criticism of the photographs it may be mentioned that a few have suffered in reproduction, in some the colour shown does not do justice to the real plant, and, more seriously, that there is no scale. Life-size or near life-size close-ups are associated with much reduced general views, so that it is not possible for anyone unfamiliar with the plants to get a clear idea of their size.

Throughout, the book is written in simple, direct language, with a minimal use of technical terms, so that it is readily comprehensible to those with no previous botanical knowledge. It is crammed with information about the plants both as garden objects and as they grow. It is one that should appeal to the horticulturist and to all interested in flowers. With its numerous plates and excellent get-up the volume is by no means expensive.

R. S. ADAMSON

"Weeds." By W. C. Muenscher. 2nd edn. 8vo. xvi + 560 pp. (Macmillan Co., New York.) 70*s*.

Taken as a whole, weeds are not so much a botanical as a human psychological category within the plant kingdom, for a weed is simply a plant which in a particular place and at a particular time arouses human dislike and attempts are made at its eradication or control, usually because it competes with more desirable plants, sometimes because it serves as a host to their pests and diseases or is unpalatable or dangerous to domesticated beasts. Professor Muenscher's textbook deals with the plants regarded as weeds in the United States and Canada, more than 550 of them! Thus it rates as weeds a number of plants which no book written for the British Isles would ever treat so harshly, e.g. *Campsis radicans*, *Convallaria majalis*, *Hemerocallis fulva* and *Potentilla fruticosa*. These become weeds only in special circumstances. They are far removed in character from the anthropophytes, the ancient weeds of broken soil which have followed man, the cultivator, so long and so widely and have become so

dependent upon his activities that their original home is obscure. Professor Muenscher deals with these, too. His first edition of 1935 contained descriptions of 500 weeds; to this revised and enlarged edition 71 more have been added. It is accordingly the most comprehensive work available on the weeds of north temperate countries and is particularly useful as a guide to their identification. Besides descriptions and black-and-white illustrations it includes notes on control measures, chapters on the dissemination and importance of weeds, a general key, a glossary and an extensive bibliography. Ease of consulting it would have been much increased had the names of the plants been set in a bold type or in capitals so as to stand out from the rest of the text and one hopes that the publishers will bear this in mind when a third edition of this standard work becomes necessary.

W. T. STEARN

"Neues Planen und Gestalten für Haus und Garten, Friedhof und Landschaft." By A. Baumann. 8vo. vii + 231 pp. Illus. (Deutsche Gärtnerbörse, Aachen.) DM. 16.80

To most British designers of gardens the chief interest of this book will be in its 1,300 or so instructive photographs, plans and diagrams relating mostly to gardens in Central Europe, but giving suggestions that can well be applied elsewhere.

W. T. STEARN

"Soil Fertility." By C. E. Millar. 436 pp. Illus. (Chapman & Hall, 1955.) 54*s*. net.

This is essentially a text-book for students and research workers, and within this field serves a very useful purpose. The emphasis is upon the plant itself as an indicator of fertility of the soil in which it grows, and with this in mind the author begins with a review of all the factors essential for plant growth. He assumes some familiarity with plant physiological principles and with the fundamentals of agricultural chemistry. Separate chapters are devoted to absorption, colloidal phenomena, soil reaction and soil organic matter. Over half the book is devoted to detailed consideration of the individual nutrient elements, their importance to the plant, their occurrence in the soil, and the fertilizers important as sources of them. Throughout, the author has confined himself mainly to fundamentals rather than to the more applied aspects of soil-management techniques. The book is well documented for an American student but there is an almost complete lack, so common in American books, of references to work outside the country.

It is undoubtedly a book of considerable scientific importance and one which should run to regular editions.

R. H. STOUGHTON

"Bulb Growing." By Arthur J. Simons. 101 pp. Illus. (W. & G. Foyle, Ltd.) 2*s*. 6*d*.

An unpretentious, readable little book on the cultivation of the more common bulbs, written for the inexperienced amateur, to whom we recommend it.

"Bulbs All the Year Round." By Roy Genders. 304 pp. Illus. (Faber and Faber, London.) 25*s*.

The most striking thing about this book is the jacket, on which is reproduced part of the frontispiece, which purports to be a reproduction of a colour photograph of *Amaryllis belladonna*, but which, unfortunately, is quite clearly not that plant, nor even one which could easily be mistaken for it. On the other hand, the black-and-white illustration facing page 144, which is said to be a picture of *Galanthus elwesii*, might perhaps be regarded as a forgivable mistake; but a mistake it is, for it is a reproduction of a photograph of *Galanthus* 'Straffan' growing in the late E. A. Bowles's garden at Myddelton House.

"Over the years," says the author in a prefatory note, "I have gathered together copious notes which have been sorted and placed in book form." It is a pity that the notes were not edited more carefully, for then not only might many misspelt names have been corrected, but there might also have been fewer misleading statements, e.g.—that *Narcissus* 'King Alfred' was "introduced in 1909"; that *Narcissus triandrus* is called "angels' tears (*sic*) on account of the corolla hanging like a tear beneath the perianth"; that if daffodils show symptoms of damage by eelworms "the bulbs should be dug up during early July when dormant and should then be immersed in a tank of boiling water for three hours at a constant temperature of 110° F."; that tulip offsets should "remain in the nursery beds 2½ years"; that *Tulipa clusiana* is called "the

Lady Slipper tulip"; that Crinum "bulbs should be buried 2 inches below the surface of the compost, but when planting outdoors this should be increased to 4 inches"; and that *Lilium candidum* should be included in a list of "Lilies for shade" and omitted from a list of "Lilies for sunny position", although it is stated elsewhere that it "enjoys a sunny position".

"Pinks, Selection and Cultivation." By F. R. McQuown. 175 pp. Illus. (Macgibbon & Kee.) 10*s.* 6*d.*

This book is unique, for no other author in modern times has thought it worth while to devote 176 pages to pinks and pinks alone. For hundreds of years the pink was looked on as a very humble flower, a poor relation of those lords and painted ladies of the dianthus world, the carnations. It is true that for a while, early in the nineteenth century, the pink became a florist's flower. From this period there has come down to us that most beautiful form of pink, which Mr. McQuown himself has done so much to develop and improve, the flower with the dark eye and laced edge.

Mr. McQuown's book will rejoice the hearts of all who love pinks and want to grow them well. Though it does not deal with the history of the plant, it is in all other respects the vade-mecum, the pocket encyclopaedia, in which the reader will find all necessary information for growing and exhibiting pinks and for breeding new varieties. The marks of the author's scientific training can be seen in his style, his fondness for accurate detail and in his search for results through an endless series of experiments. Yet it would be wrong to suppose that Mr. McQuown is interested only in a scientific approach to his subject; he is obviously also an enthusiast. It is the combination of these two qualities which makes this such an instructive book to the amateur and a stimulus to the exhibitor and breeder.

C. OSCAR MORETON

"The Iris Year Book, 1955." 8vo. 182 pp. Illus. (The British Iris Society.)

As usual, this book contains a number of articles which should be of both interest and help to the keen iris-grower. One notices in particular the increased interest in the more dwarf bearded irises, and Prof. L. F. Randolph's authoritative survey of the European and Eastern Mediterranean species should provide a sound and most welcome basis for increased knowledge of these species as he has a number of interesting conclusions on the origin of some species such as *I. pumila*. The book is well illustrated with photographs of the latest irises to receive awards and also some unusual Oncocylus hybrids.

PATRICK M. SYNGE

Amateur Gardening Picture Books: No. 4, "Plant Propagation", and No. 5, "Herbaceous Borders". Edited by A. G. L. Hellyer. 60 pp. Illus. (Collingridge.) 7*s.* 6*d.*

These little volumes maintain the high standard of usefulness set by their three forerunners on chrysanthemums, roses and tomatoes. The various jobs in the particular branch of gardening with which each is concerned are illustrated in detailed photographs with simple explanatory notes. That on plant propagation is likely to be specially useful, for this method is particularly suited for demonstrating the operations involved in this important department of horticulture. Moreover, it deals with, besides the commoner methods of propagation, such matters as aerial layering and leaf and root cuttings. Beginners who are not so fortunate as to be able to enjoy the advantage of observing an experienced gardener at work should find this series very useful.

MORTON

"What to Grow and How to Cook It." By William Blackley. Cr. 8vo. 192 pp. (Werner Laurie Ltd.) 9*s.* 6*d.*

This book describes briefly the cultivation of the main vegetables and some less common ones as well and gives some tempting recipes for cooking them. It is written in a direct and racy style and should be a help to many housewives. It also contains a number of recommendations of varieties for particular purposes.

"Growing Apples." By Robert Atkinson. Cr. 8vo. 127 pp. Illus. (Rupert Hart-Davis.) 7*s.* 6*d.* net.

Growing apples commercially probably demands more planning and forethought than any other crop. It is a long-term business and initial mistakes made are not easily

rectified. Although much has already been written on the subject Robert Atkinson's "Growing Apples" breaks new ground in approaching it from the small grower's viewpoint. The choice of varieties, layout and planting take up much of the book and the need for careful planning is everywhere emphasized. Much that is said would be generally accepted and applauded but the use of the rectangular plant is surely debatable. The suggested marketing of 'Cox's Orange Pippin' as early as October to the exclusion of excellent varieties such as 'Lord Lambourne' would also be open to criticism.

It is heartening to see the value of local markets mentioned, for the small grower can do much to improve supplies in many areas, but only provided he has an eye to producing apples of good quality. The suggestion that some growers may decide on varieties noted for quality rather than colour is interesting. The public do not know what they are missing and the small grower with a local market has the best means of educating them.

E. G. GILBERT

The following books have been received:

"Teach Yourself Books. Forestry." By T. A. Robbie. 180 pp. (English Universities Press Ltd., London.) 6*s*.

"Salad and Other Food Crops in Glasshouses." Bulletin No. 143 of the Ministry of Agriculture, Fisheries and Food. 51 pp. Illus. (London: H.M.S.O.) 2*s*. 6*d*.

"Weather and the Land." Bulletin No. 165 of the Ministry of Agriculture, Fisheries and Food. 35 pp. Illus. (London: H.M.S.O.) 3*s*.

"Refrigerated Stores for Fruit." Bulletin No. 159. Ministry of Agriculture, Fisheries and Food. Department of Scientific and Industrial Research. 25 pp. Illus. (London: H.M.S.O.) 2*s*. 0*d*.

"Felted Beech Coccus." Leaflet No. 15. Forestry Commission. 8 pp. Illus. (H.M.S.O.) 6*d*.

"Rusts of British Forest Trees." Forestry Commission Booklet No. 4. 14 pp. Illus. (H.M.S.O.) 2*s*. 6*d*.

"Report on Forest Research for the year ending March, 1954." 177 pp. Illus. (H.M.S.O.) 6*s*.

"Handbook on Pests and Diseases." Plants and Gardens, Vol. 11, No. 1. 96 pp. Illus. (Brooklyn Botanic Garden.) $1.00.

"Handbook on Flower Arrangement." Plants and Gardens, Vol. 11, No. 3. 64 pp. Illus. (Brooklyn Botanic Garden.) $1.00.

"Handbook of Roses." Plants and Gardens, Vol. 11, No. 2. 64 pp. Illus. (Brooklyn Botanic Garden.) $1.00.

"The Age-Long Story of Flowers in London." By U. W. A. Parkes. 60 pp. (Miss U. W. A. Parkes, 67 Ladbroke Grove, London, W.11.) 3*s*. 6*d*.

"Jamaica Palette." By John Wood. 160 pp. Illus. (Merritt & Hatcher Ltd., London.) 52*s*. 6*d*. or 63*s*.

"The Greenhouse." A Quarterly Review for all Gardeners. 65 pp. Illus. (Paul Langfield & Co., Bath Road, Hounslow, Middlx.) 2*s*. 6*d*.

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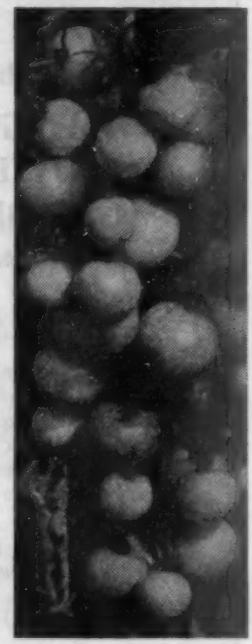

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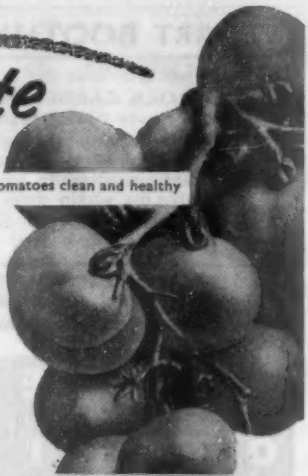

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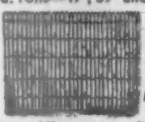
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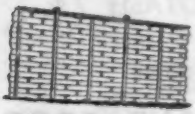

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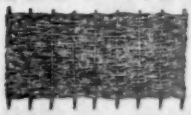

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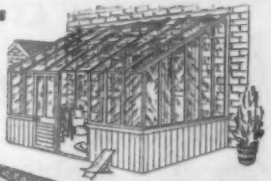

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